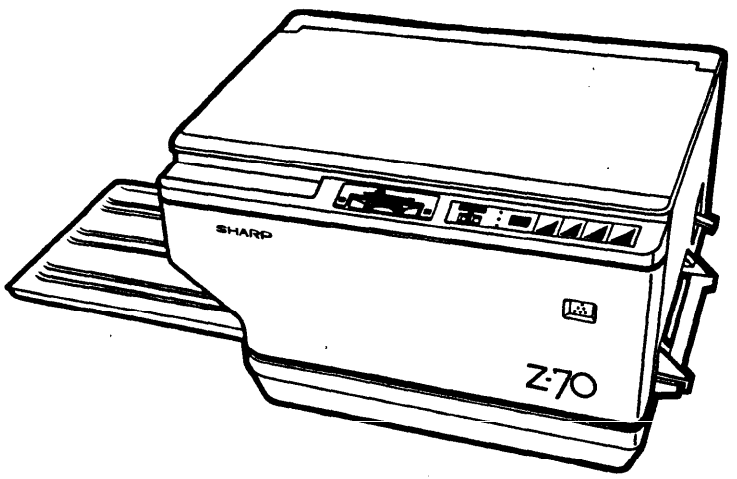
SHARP SERVICE MANUAL

CODE: 00Z70SM///-E



MODEL Z-70

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SHARP CORPORATION

[1] BASIC SPECIFICATIONS

Type:
Desktop
Copying system:
Dry-type electrostatic plain paper copier
Kinds of originals:
Sheets, book
Thickness: 30 mm (1.18 inch) maximum with the original cover in use.
Weight: 3.0 kg maximum
Original size:
B4 (10" x 14") maximum
Copy size:
(Cassette feed)
A4, B5, A5 (56 to 80 g/m^2)
or 8½ x 14" to 8½ x 5½" (14.9 lbs to 21.3 lbs)
(Manual feed)
A4 to A6, postcard, business card (52 to 130 g/m^2)
or 8½ x 14" to 8½ x 5½" (13.8 lbs to 34.5 lbs)
Copy speed:
8 copies/minute
(A4, B5, A5 8½ x 11", 8½ x 5½") . . .Normal mode
7 copies/minute (8½ x 14") . . . Normal mode
7 copies/minute (all sizes) . . . Reduction mode
6 copies/minute (all sizes) . . . Enlargement mode
First copy:
11 seconds (time required until the copy paper is delivered to the exit tray after depression of the PRINT switch for A4 or letter size paper.)
Warmup time:
20 seconds at rated voltage, room temperature at 20 to 25°C (68° to 77°F), 65%RH.
Multicopying:
1 to 19 copies, countdown type, with auto repeat
Magnification ratio:
(Inch series)
1 : 1.24, 1 : 1, 1 : 0.75, 1 : 0.64
(AB series)
1 : 1.24, 1 : 1, 1 : 0.8, 1 : 0.7
Exposure system:
Slit exposure by moving table.
Paper feed system:
Cassette and manual feeds
Developing system:
Magnetic brush development (2-component developer)
Fusing system:
Heat roller type
Light source:
Halogen lamp (100V series 285W, 200V series 285W)
Power requirements:
Local supply voltage ±10%.
Power consumption:
1.15 kW maximum, 50 wh standby (power down mode)
Physical dimensions:
470(W) x 440(D) x 255(H) mm
18.5(W) x 17.3(D) x 10(H) inch.
Weight:
20.5 kg (45 lbs)

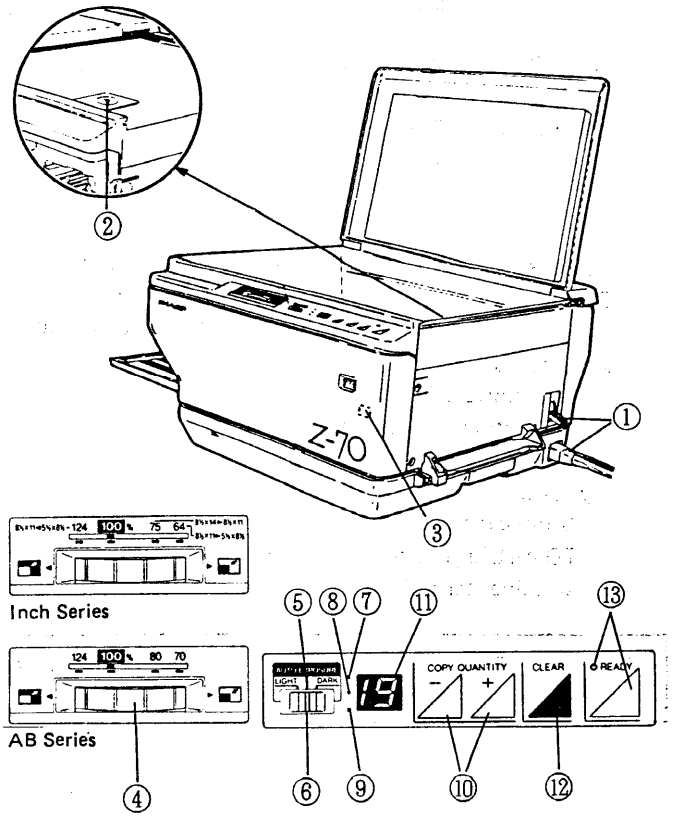
Display Functions:

PRINT:	The green lamp turns ON when the copier is ready for copying, turns OFF during the warmup time, and flashes when in the power down mode.
MULTICOPY:	Multicopy number displayed on LED, normally 0.
MISFEED:	The red lamp flashes when the paper is misfed.
TONER:	Flashes when the toner box is empty.
DRUM:	ON after 8,000 copies. Starts to flash after 9,000 copies and the machine stops.

Accessories:
Semi-universal cassette x 1
Instruction manual x 1
Power supply cord x 1
Options:
Drum cartridge
TD cartridge (black, red, blue, brown)
Machine stand (ZT-50D)

The term "TD cartridge" means the "Toner Developer cartridge".

[2] OPERATION PANEL AND INDICATOR FUNCTIONAL DESCRIPTION



① Power switch and power supply cord
Power is turned on and off using the power lever.

② Upper frame release button
Used to release the frame lock when a misfeed occurs or the drum cartridge has to be replaced.

③ Doorswitch
Used to check the front door position.
If the front cover is opened, the misfeed and multicopy indicator will be reset.

④ Ratio select dial
Used to control magnification ratio, two choices for reduction, one choice for enlarge ment, and one choice for normal size.

⑤ Auto exposure control
Selects appropriate exposure rate depending on the contrast and background color of the original.

⑥ Exposure control lever
It has three set positions.
For most originals, set at the center position.
To make the copy darker, move to DARK.
To make the copy lighter, move to LIGHT.

⑦ Misfeed indicator
When a misfeed occurrs, this lamp turns ON.

⑧ TD cartridge replacement indicator
The lamp flashes when the TD cartridge needs replacement.

⑨ Drum cartridge replacement indicator
After 8,000 copies, the indicator will start to flash. An additional 1,000 copies can be made. At this time the indicator will stop flashing and stay ON. No additional copies can be made until the Drum cartridge is replaced.

⑩ Multicopy
Copy numbers between 1 and 19 can be entered using the (–) or (+) key. Depression of the (–) key while "0" is displayed brings "19" into the display, and continued depression of the key reduces the number. When the (+) is depressed after "19", the number is returned to "0". Every time a copy is produced in the multicopy mode, the number in the display counts down. When the (–) is depressed in the middle of multicopy operation, the number of copies already made is displayed.

⑪ Auto repeat
Upon completion of copying in the multicopy mode, the copy number previously set returns to the copy number set display. Use of the CLEAR key resets the number. One minute after completion of copying, the number and the auto repeat functions are automatically cleared.

Paper feed alarm (P indication)
If a sheet of paper is not transferred to the paper stopper after depression of the PRINT switch, or the cassette is empty. "P" is displayed in the copy number window. If the COPY NUMBER key or the CLEAR key is depressed or the MANUAL FEED switch is pressed, by using the manual feed bypass, the "P" indication disappears.
When the copier is opened, the "P" indication is also cancelled.

⑫ Clear
Multicopy and auto repeat modes are cleared with the CLEAR key. One minute after completion of copy operation, the preset number and the repeat functions are automatically cleared.

⑬ PRINT switch
20 seconds after power is turned on, the READY lamp turns ON indicating that the copier is ready for copying. If left unoperated for 90 seconds, the copier then goes into the power save mode and the READY lamp changes from ON to flashing. When the PRINT switch is pressed while the READY lamp is on, the machine immediately starts to copy. When the PRINT switch is pressed while the READY lamp is flashing, the power save mode is cancelled, the original table moves to the copy start position, and it starts the copy operation after completion of the warmup cycle. The time before the copy process starts is dependent on the time in the power save mode, but it will be less than 8 seconds after the depression of the PRINT switch.

[3] UNPACKING AND INSTALLATION

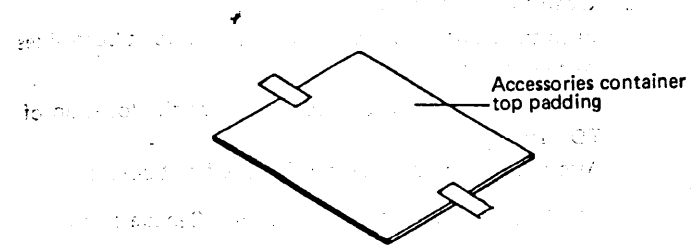
1. Unpacking

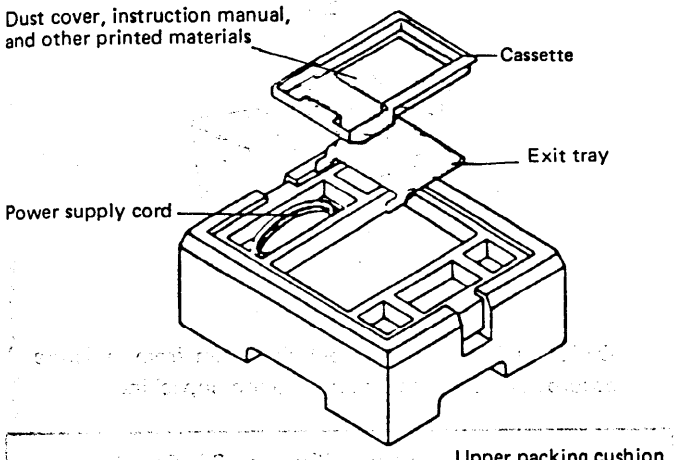
(1) Open the carton in the following sequence.

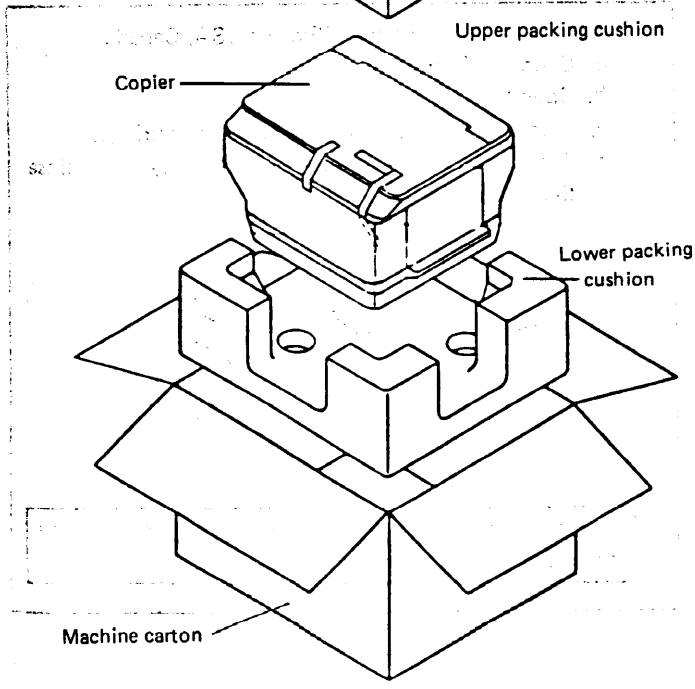
① Cut the tape around the top of the package and open the flaps.

② Remove the accessory container top padding and take out accessories.

③ Remove the upper packing cushion and take out the machine.







2. Installation

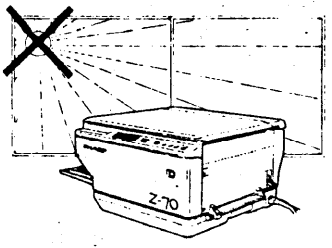
Installation requirements:

Please note the following requirements when installing the copier.

(1) Machine Environment

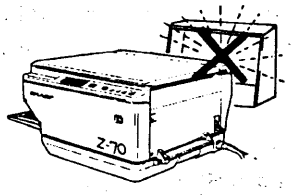
① Avoid installation in direct sunlight or bright locations near a window.

Direct sunlight may cause the plastic components and the original cover to deform. Frosted glass may also produce the same effect.



② Avoid installation in a hot, damp place or where rapid changes in humidity occur (for example; near an air conditioner).

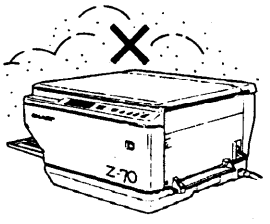
This may cause paper to dampen or moisture inside the copier, and may lead to a misfeed and deterioration in copy quality.



The recommended environmental conditions are:
20 to 25 degrees C (68 to 77 degrees F.), 65%±5%RH.
The nominal environment conditions are:
10 to 30 degrees C. (40 to 86 degrees F.), 0 to 85%RH.
If the copier is to be installed in an area of higher temperature the humidity must be lower. Example; If the temperature, is 35 degrees C. (95 degrees F), the humidity should be 65%.

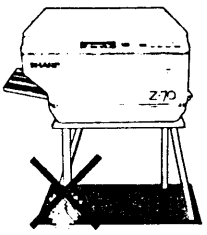
③ Avoid installation in a place where dust or vibration is encountered.

Dust deposit inside of the copier may lead to a deterioration of copy quality or machine trouble.



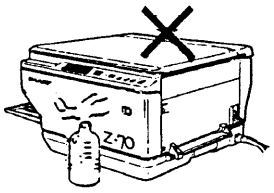
④ Install the machine on a level surface.
The toner density and copy quality may be affected unless the machine is installed in a level condition.

⑤ Do not install the copier on an unstable or uneven surface. The copier must be placed on a level surface to permit proper functioning.



⑥ Avoid installation in a place where the ventilation or air circulation is poor.

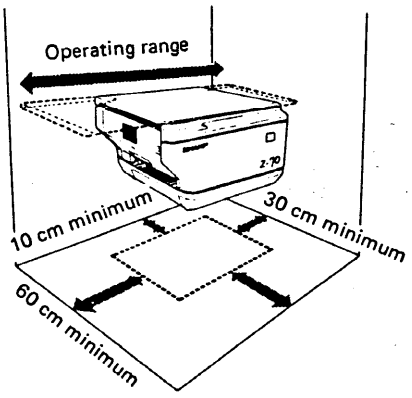
⑦ Never install the copier near inflammable materials or in the presence of ammonia fumes.
Installation near a diazo copy machine may lead to a deterioration of copy quality or a machine malfunction.



⑧ Install the copier near the wall outlet.

(2) Space around the copier

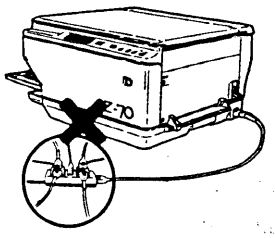
The copier requires at least 10cm of clearance between the rear side and the wall. This space is required for proper cooling fan ventilaton. Adequate working space around the machine should also be allowed for ease of operation.



(3) Power source

① The power supply line should have a capacity of more than 15A, capable of supplying more than 90% of the rated voltage at full load.

② Do not use an extension cord, or operate any other equipment from the same wall outlet.

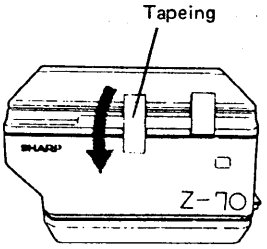


(4) Ground connection

① Use a properly grounded (three prong) wall outlet only.

3. Installation procedure

① Remove the poly bag and tapeing that secure the original table.

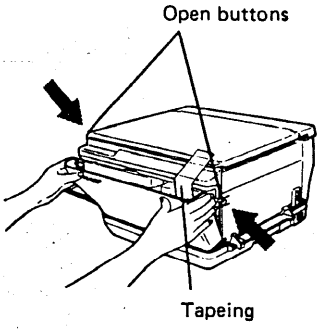


② Open the front cover.
Push the front cover open buttons located at both sides of the copier.

Remove the tapeing and spacer where the location of TD cartridge.

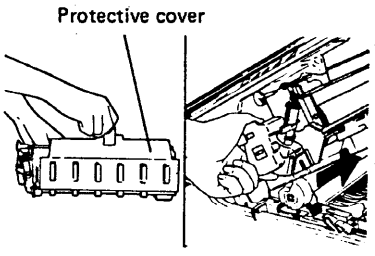
Also remove the desiccant inside the front cover:

* Desiccant is used in the USA and Canada only.



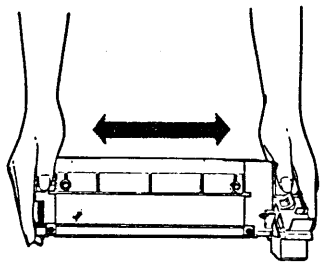
Desiccant is used to protect the drum from moisture absorption, it should discarded upon unpacking.

③ Install the drum cartridge (Except USA, Canada)
a. Open the front cover.
b. Open the upper frame.
c. Remove the cover from a new drum cartridge.
d. Push the drum cartridge in all the way, then close the upper frame.



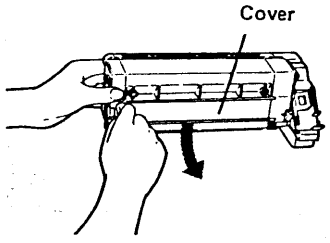
Never expose the drum to direct sunlight or touch the drum surface with your fingers.

④ Open the box containing the TD cartridge.
Remove the TD cartridge from the bag and shake it horizontally four or five times.

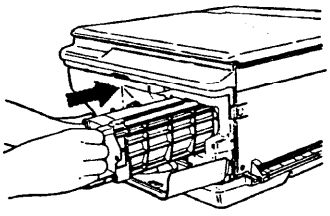


⑤ Remove the cover from the TD cartridge.

- Save the TD cartridge cover. It should be used to seal the TD cartridge if the copier must be shipped for servicing or in case you move.



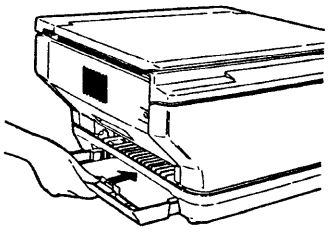
⑥ Slide the TD cartridge in until it locks in place.



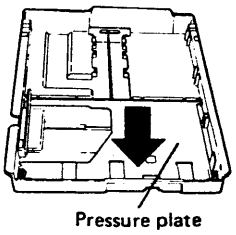
⑦ Close the front cover.

⑧ Remove the paper cassette from the bag.

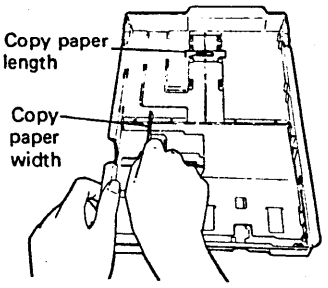
⑨ Fan the copy paper and insert it into the cassette. (Maximum: 100 sheets)



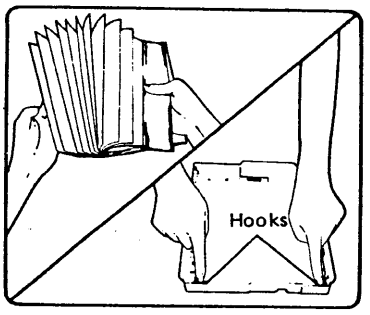
a. Push the pressure plate until it locks in position.



b. Adjust the paper guides in the cassette to the copy paper width and length.

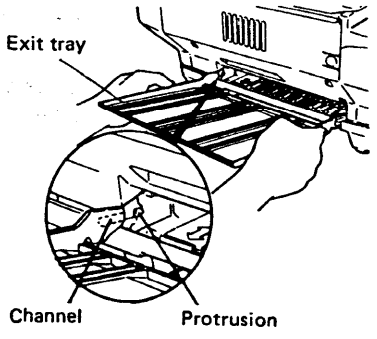


c. Fan the copy paper and insert it into the cassette. Make sure the edges go under the corner hooks.



⑩ Set the exit tray in to place.

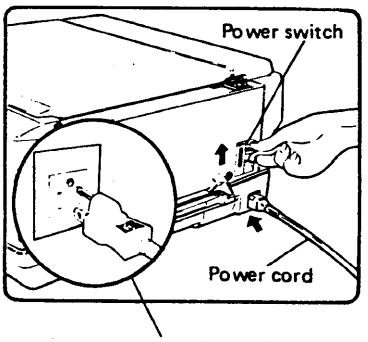
- Align the front channels with the protnisions at the paper exit to insert and mount the tray.



⑪ Plug the power cord into the copier and then into the nearest outlet.

⑫ Turn the power on.

* After machine installation or TD cartridge replacement, the ready lamp may require a longer period (two minutes or less) before it turns ON.



The AC plug that comes with the product matches your wall outlet.

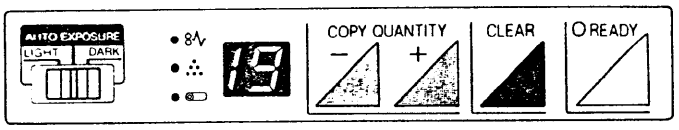
4. How to make a copy

① Open the original cover.

② Place the original in the upper right corner, and close the original cover.

③ Select the number of copies desired.

- If a mistake is made, press the clear key to clear the entry or hold the copy quantity key down. The maximum number of copies is 19.
- "0" will make a single copy.



④ To compensate for light or dark originals.

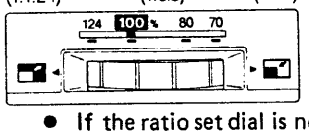
- Normally set the exposure control lever to the center position.
- Set to DARK to darken the copy.
- Set to LIGHT to lighten the copy.

⑤ Set the copy ratio.
Turn the dial until the indicator is set to the desire original size and copy paper size combination, or until the indicator is at the desired copy ratio.

- Available dial positions and ratios are shown below.

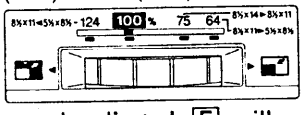
AB Serises

Enlargement (1:1.24)	Reduction (1:0.8)	Reduction (1:0.7)



Inch Series

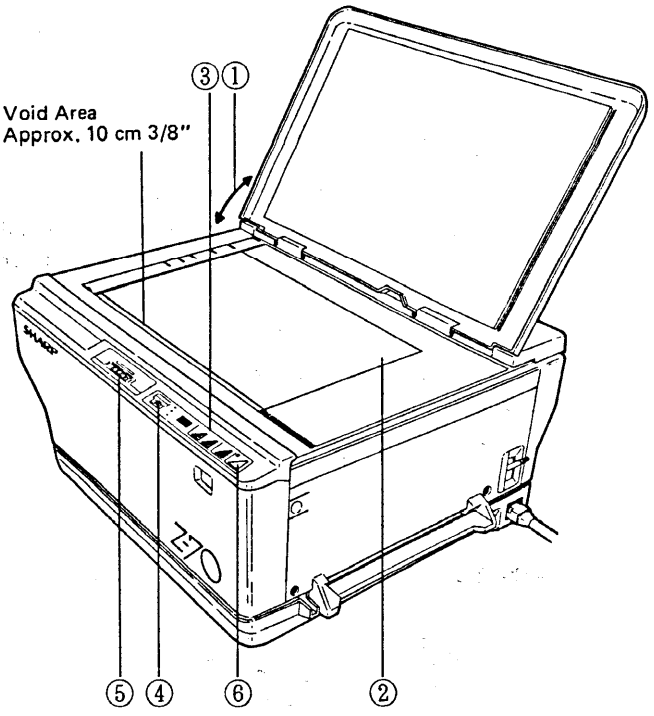
Enlargement (1:1.24)	Reduction (1:0.75)	Reduction (1:0.64)



- If the ratio set dial is not properly adjusted, [E] will blink in the display and copying will not be possible.
- Do not turn the ratio set dial while copying is in progress.
- The indicated enlargement ratio does not correspond exactly to the indicated paper combinations.

⑥ Press the print key when the green light indicates that the copier is ready.

- Press the clear key to stop copying.



[4] SUPPLIES

1. Drum cartridge, TD cartridge

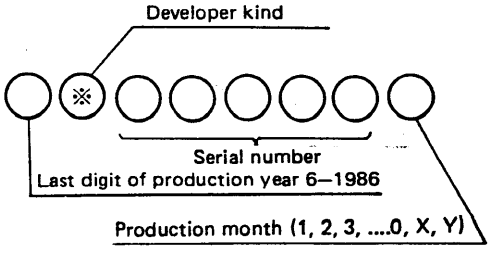
Name	Description		Product name		* Life Approx.	Storage conditions (temperature and humidity)
Drum cartridge	Drum cartridge x 1 Instructions x 1		ZT-50DR		8,000 copies	%RH 90 20 -5℃ 40℃
TD cartridge	TD cartridge x 1, (including developer and toner)		For USA	Except USA	※	
		Black	ZT-50TD1	ZT-50DC1		
		Red	ZT-50TD2	ZT-50DC2		
		Blue	ZT-50TD3	ZT-50DC3		
		Brown	ZT-50TD4	ZT-50DC4		
		Green	ZT-50TD5	ZT-50DC5		

※3,000 copies for black (2,700 copies for color) for A4 or letter size with 5% toned area.

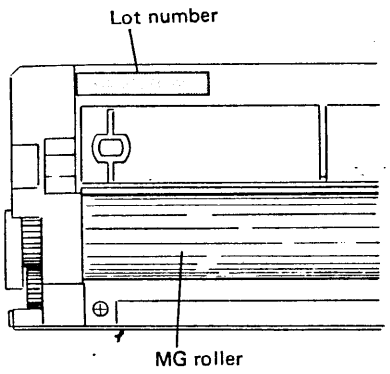
* These are estimates only, life will vary depending on actual useage.

NOTE: How to identify the lot number

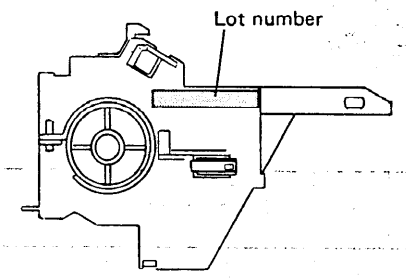
(TD cartridge)



※1. Black developer (JAPAN)
2. Black developer (EXPORT)
4. Red developer
5. Blue developer
6. Brown developer
7. Green developer
0. No classification



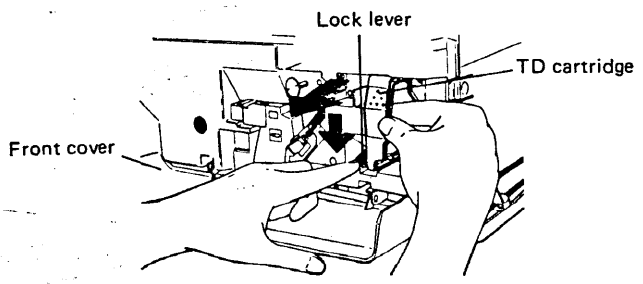
(Drum cartridge)
Same as TD cartridge.



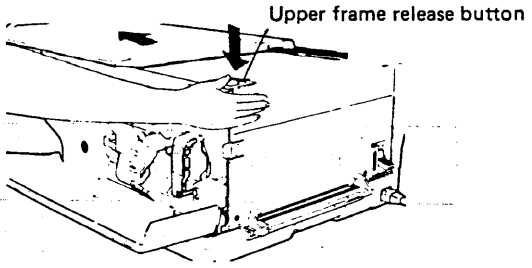
Rear frame side of the drum cartridge

2. Replacing the drum cartridge

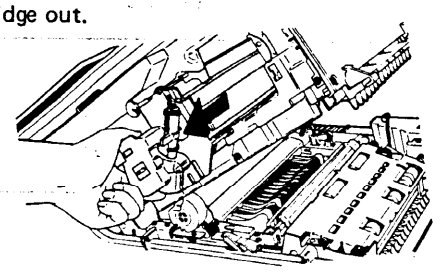
① Turn power off and open the front cover.
② Press down on the catch and pull out the TD cartridge.



③ Move the original table to the left, and press the upper frame release button to open the copier.

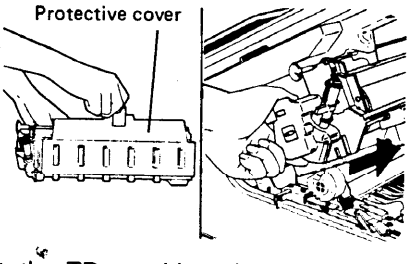


④ Grasp the handle of the drum cartridge and pull the drum cartridge out.

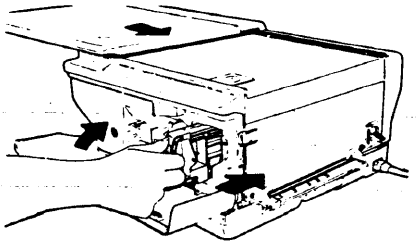


NOTE: The drum cartridge can not be removed or inserted unless the upper frame is open.

⑤ Remove the protective cover from the new drum cartridge.
⑥ Push in the drum cartridge all the way in, then close the upper frame.

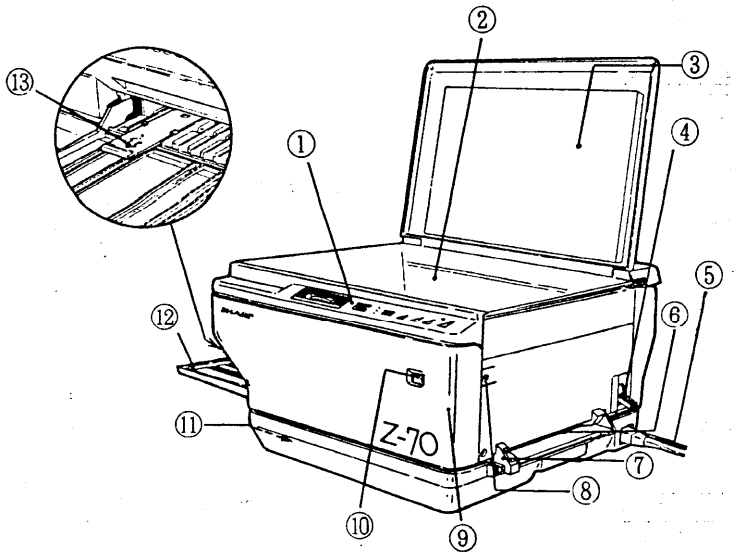


⑦ Insert the TD cartridge, then close the front cover.
⑧ Turn power on and make sure that the DRUM replacement lamp is extinguished.



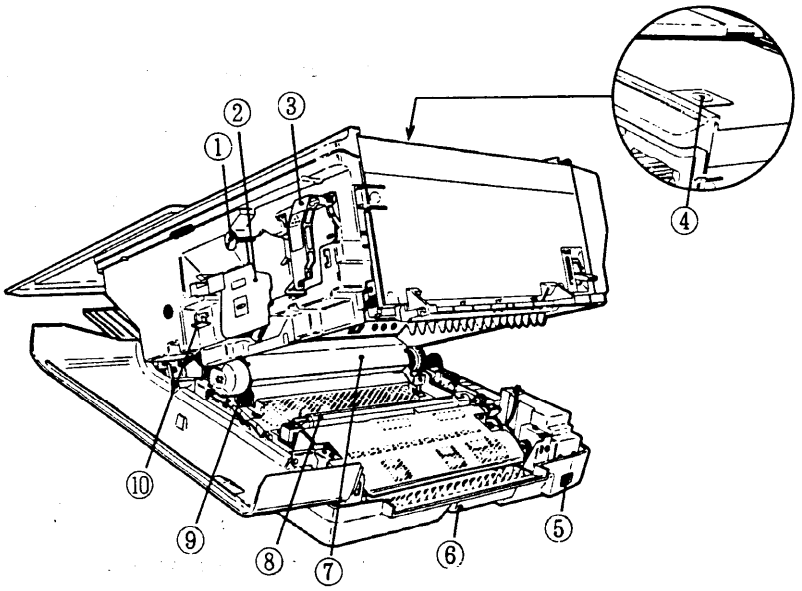
[5] COMPONENT LOCATION

1. External



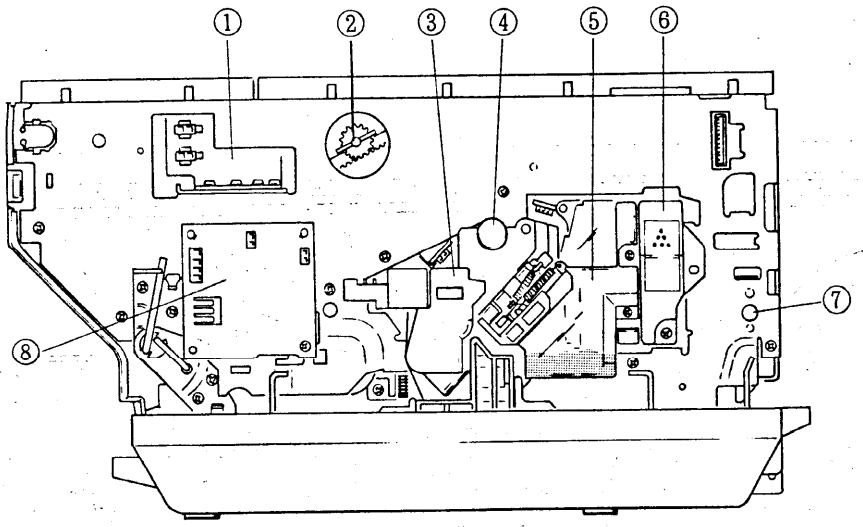
①	Operation panel	②	Original table glass	③	Original cover
④	POWER switch lever	⑤	Power supply cord	⑥	Manual feed by-pass
⑦	Manual feed guide	⑧	Front cover open button (paper entry side)	⑨	Front cover
⑩	Color check window	⑪	Cassette	⑫	Exit tray
⑬	Business card release lever				

2. Open view



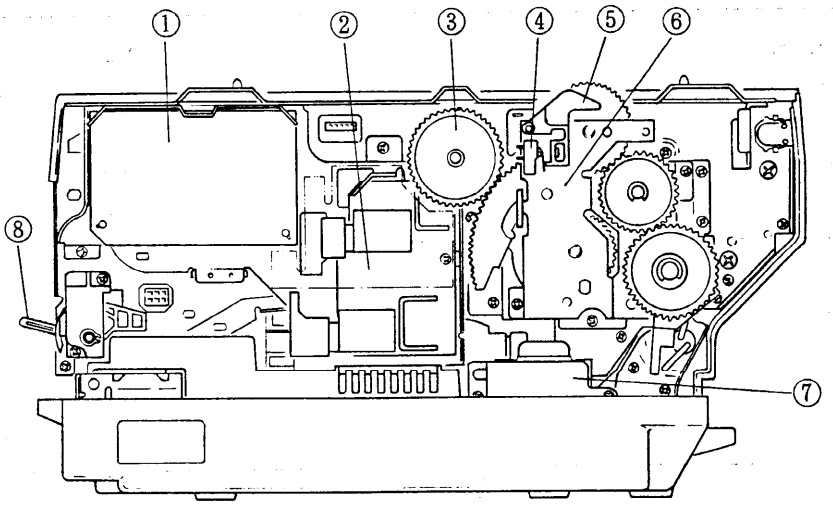
①	Cleaning lever	②	Drum cartridge	③	TD cartridge
④	Upper frame release button	⑤	AC socket	⑥	Carrying handle (paper entry side)
⑦	Fuser	⑧	Transfer corona unit	⑨	Fuser accessing lever
⑩	Transfer corona cleaner				

3. Front frame side



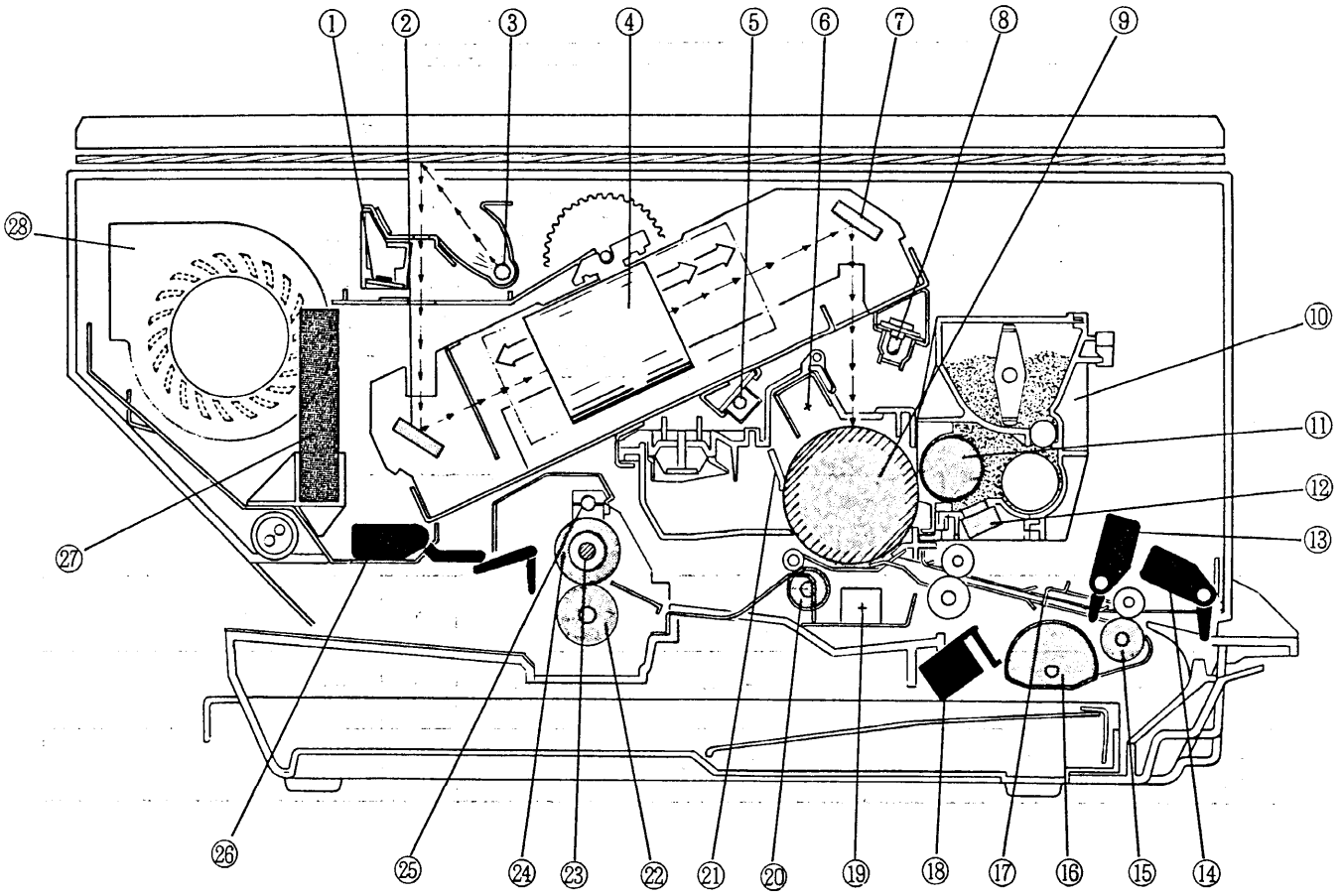
①	Light source unit	②	Joint shift	③	Drum cartridge
④	Cleaning lever	⑤	Toner collection container	⑥	TD cartridge
⑦	Doorswitch actuator (interlinked with the main switch)	⑧	CLR PWB		

4. Rear frame side



①	Main PWB	②	High voltage transformer unit (MTHVG)	③	Selector gearwheel
④	Table start position sensor (MS4) and table home/overrun position sensor (MS5)	⑤	Sensor actuator arm	⑥	Clutch unit
⑦	Power transformer	⑧	Power switch lever		

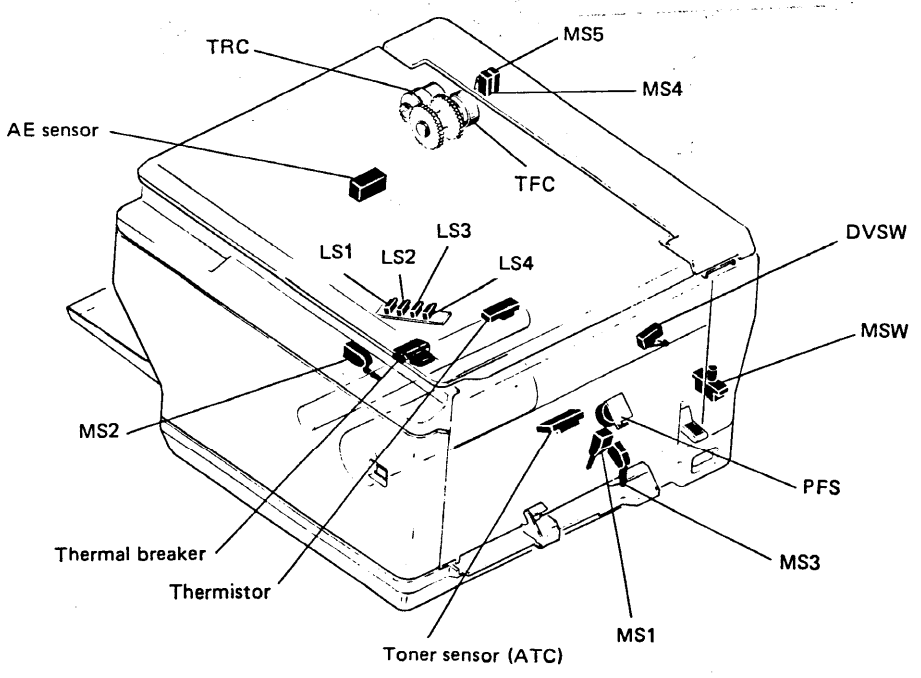
5. Cross section



①	Auto exposure sensor	②	No.1 mirror	③	Copy lamp
④	Zoom lens	⑤	Discharge lamp	⑥	Main corona
⑦	No. 2 mirror	⑧	Blank lamp PWB (side lamp, void lamp)	⑨	OPC drum
⑩	TD cartridge	⑪	MG roller	⑫	Toner concentration sensor
⑬	Paper entry sensor (MS 1)	⑭	Manual feed paper entry sensor (MS 3)	⑮	Paper feed roller B
⑯	Paper feed roller A	⑰	PS plate	⑱	Cassette paper feed solenoid (PFS)
⑲	Transfer corona	⑳	Separation roller	㉑	Cleaner blade
㉒	Lower heat roller	㉓	Heater lamp	㉔	Upper heat roller
㉕	Thermistor/thermal fuse/thermal breaker	㉖	Paper exit sensor (MS 2)	㉗	Ozone filter
㉘	Cooling fan (main motor driven)				

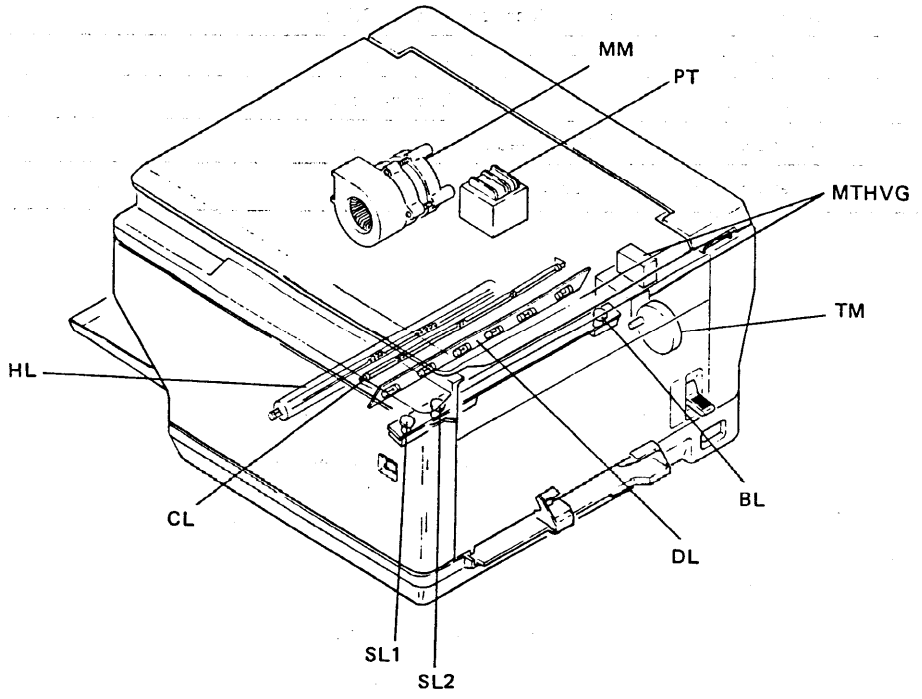
6. Switch, sensor, solenoid locations

Name	Type	Function
MS 1	Switch	Paper entry sensor
MS 2	Switch	Paper exit sensor
MS 3	Switch	Manual feed paper entry sensor
MS 4	Microswitch	Table start position sensor
MS 5	Microswitch	Table home/overrun position sensor
MSW	Switch	Power switch
DVSW	Microswitch	Senses installation of the TD cartridge in the copier. If the TD cartridge is not installed, the machine will not operate because power is not supplied to the main PWB.
Toner sensor	Magnetic sensor	Toner concentration sensor
AE sensor	Photosensor	Original contrast sensor
Thermistor	Thermistor	Upper heat roller surface temperature sensor
Thermal breaker	Thermal reset	Upper heat roller surface temperature sensor (manually reset)
LS 1	Microswitch	Lens location sensor (x 1.24)
LS 2	Microswitch	Lens location sensor (x 1.0)
LS 3	Microswitch	Lens location sensor (x 0.75)
LS 4	Microswitch	Lens location sensor (x 0.64)
PSF	Solenoid	Cassette paper feed solenoid
TFC	Magnetic clutch	Table feed clutch
TFC	Magnetic clutch	Table return clutch



7. Motor, transformer, lamp locations

Symbol	Name	Function
MM	Main motor	Main drive motor also drives the cooling fan.
TM	Toner motor	Toner supply motor
PT	Power transformer	Power transformer
MTHVG	Main and transfer high voltage units	Main corona and transfer corona high voltage supply units
DL	Discharge lamp	For removal of residual charge on the drum sufface
CL	Copy lamp	For exposure of original
HL	Heater lamp	For heat roller heating
SL 1	Side lamp 1	Discharges the drum surface which is out of the image area in the reduce mode.
SL 2	Side lamp 2	Discharges the drum surface which is out of the image area in the reduce mode.
BL	Void lamp	Discharges the drum surface which comes in contact with the remover tape (separator).



[6] COPY PROCESS

1. Basic copy process

A. Copy process

1. Charge

A uniform negative charge is applied to the opc drum surface by the main corona.

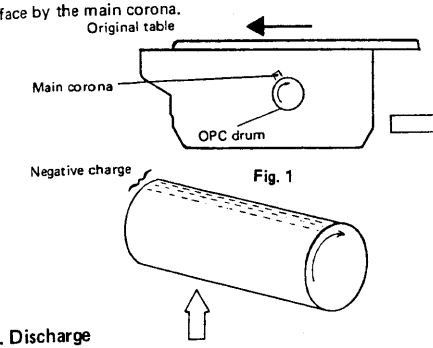


Fig. 1

2. Exposure

Light from the copy lamp, reflected from the original, is projected onto the drum surface through the ZOOM lens. The resistance of the OPC layer decreases for the area exposed by the light (corresponding to the light area of the original). The light neutralizes the negative charge. The dark areas of the original do not reflect the light and an electrostatic latent image is formed on the drum surface.

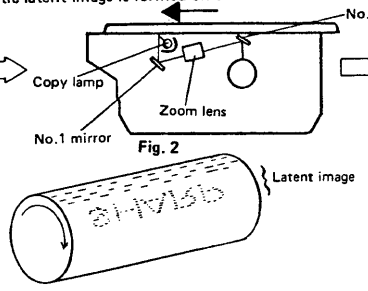


Fig. 2

3. Developing

The electrostatic latent image in the drum surface is converted into a visible image by the toner.

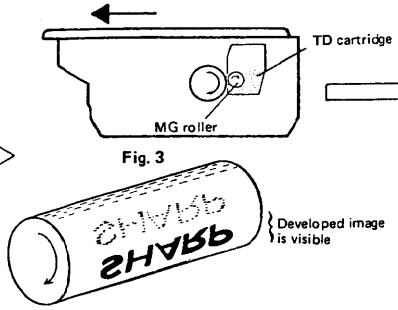


Fig. 3

4. Transfer

The visible image on the drum surface is transferred onto the copy paper by applying a negative charge from the transfer corona to the back of the copy paper.

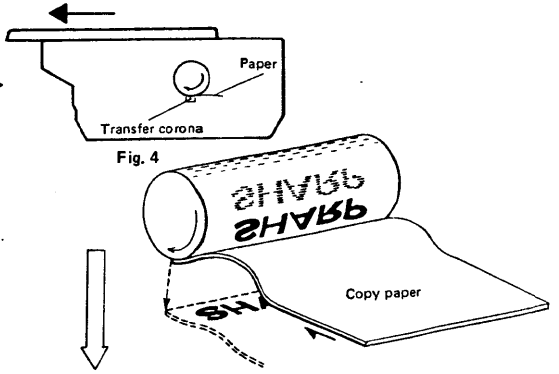


Fig. 4

8. Discharge

Prior to charge, light from the discharge lamp is projected over the drum to reduce electrical resistance of the OPC layer and remove any residual charge to evenly neutralize the drum surface.

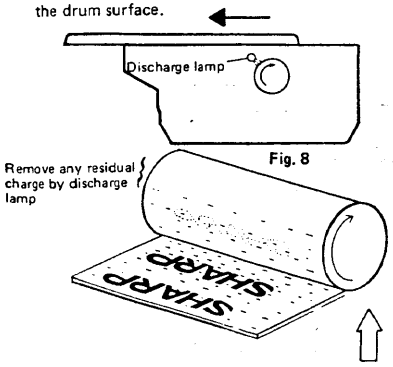
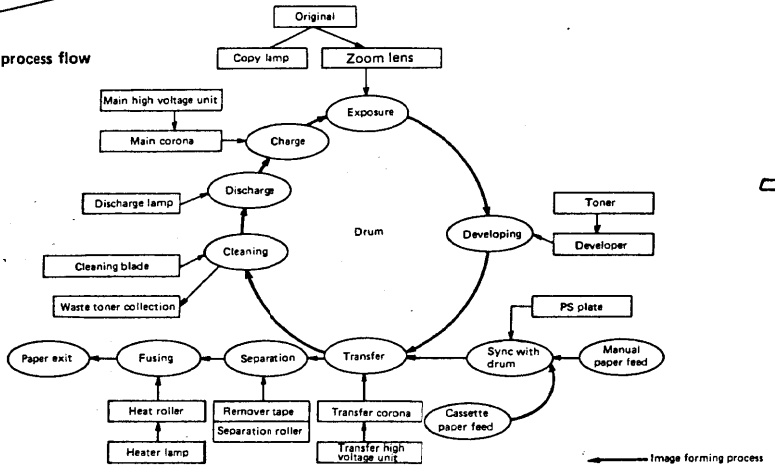


Fig. 8

B. Copy process flow



5. Separation

The paper is separated from the drum by the remover tape and the separation roller.

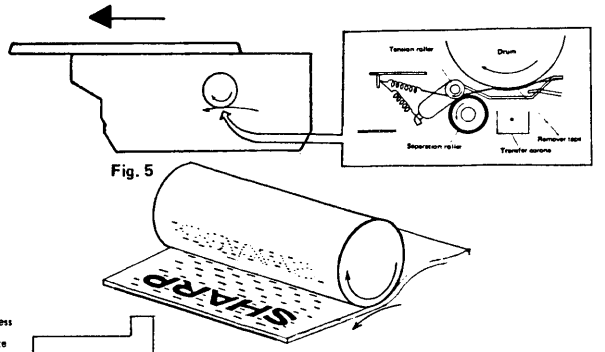


Fig. 5

7. Cleaning

Residual toner on the drum surface is collected by the cleaning blade.

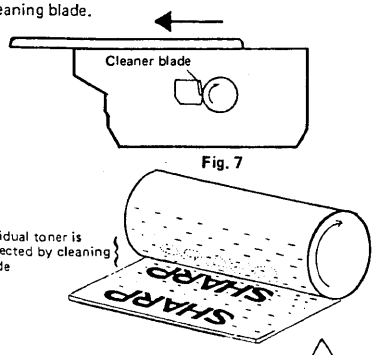
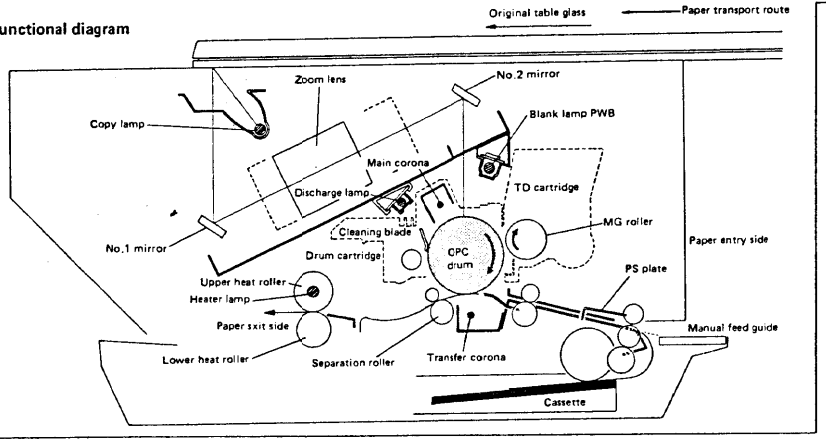


Fig. 7

C. Functional diagram



6. Fusing

Through a combination of heat and pressure, the image is fused into the copy paper.

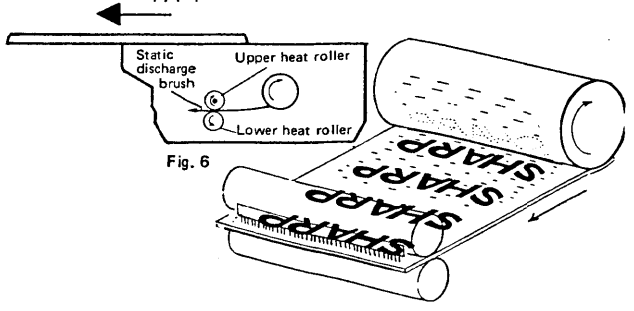


Fig. 6

2. Image forming process steps

Image forming:

A charge is applied to the drum surface by the main corona, and the image of the original is exposed by the copy lamp. The charge in a light image area is dissipated according to the degree of density to form a visible image on the drum surface with toner.

Step-1: Optical discharge
Residual charge on the drum surface is removed.

Step-2: Charge
Step-3: Exposure
Latent image is formed on the drum.

Step-4: Developing
Latent image formed on the drum is then developed into a visible image with toner.

Step-5: Transfer
The visible image (toner image) on the drum is transferred onto the copy paper.

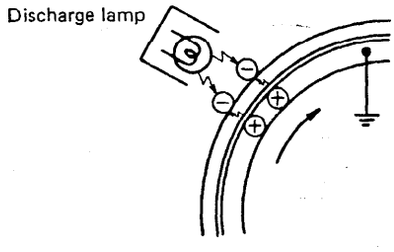
Step-6: Cleaning
Residual toner on the drum surface is collected by the cleaning blade.

Step-7: Optical discharge
Residual charge on the drum surface is removed.

3. Description of process

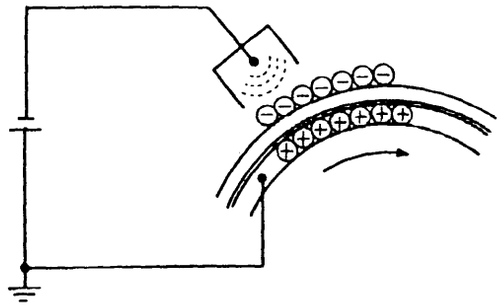
Step-1: Optical discharge (by the discharge lamp)

Prior to charge, light from the discharge lamp is projected over the drum to reduce electrical resistance of the OPC layer and remove any residual charge to evenly neutralize the drum surface. As the electrical resistance is decreased, the positive charge in the aluminium layer moves to neutralize the negative charge present in the OPC layer.



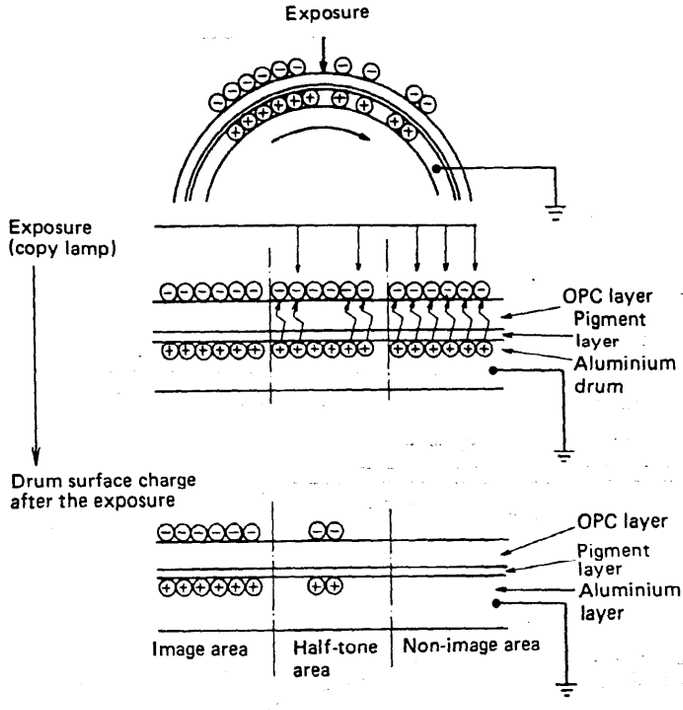
Step-2: Charge

A uniform negative charge is applied over the OPC drum surface by the main corona unit.



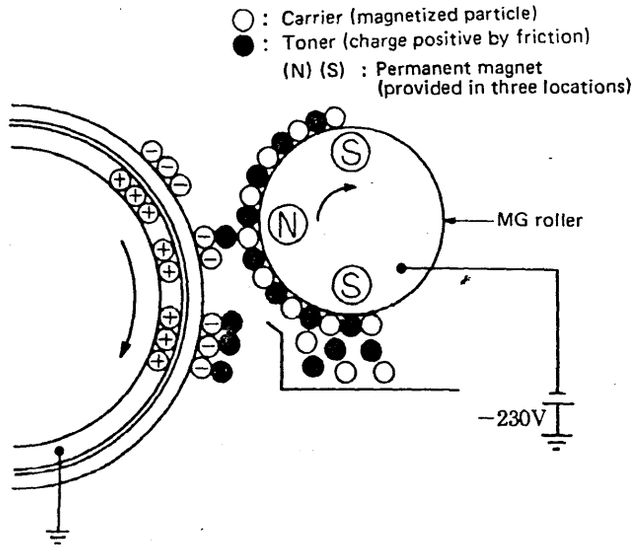
Step-3: Exposure (copy lamp, mirrors, and lens)

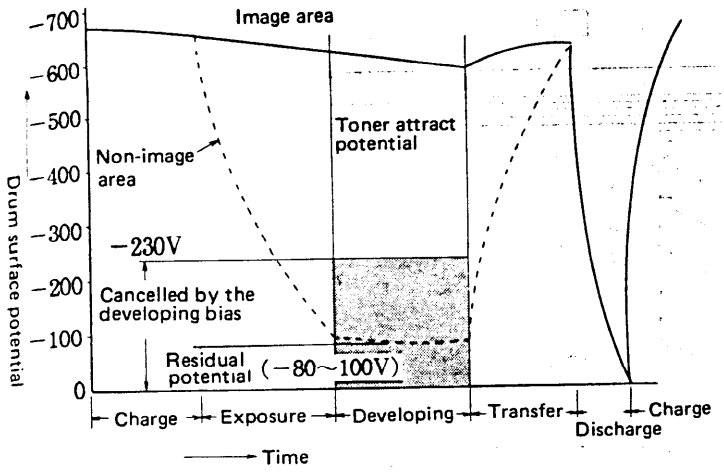
Light from the copy lamp, reflected from the original is projected onto the drum surface through the mirrors and lens. The resistance of the OPC layer decreases for an area exposed by the light (corresponding to the light area of the original). The light neutralizes the negative charge. The dark areas of the original do not reflect the light and form an electrostatic latent image.



Step-4: Developing (−230V DC bias)

The electrostatic latent image in the drum surface is converted into a visible image by the toner. A bias potential of −230V is applied to the carrier (MG roller) in this two component magnetic brush developing method, and the toner is charged positive through friction with the carrier.



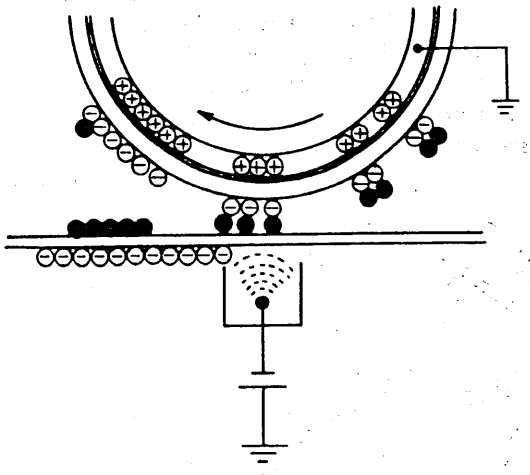


Toner is not attracted to the non-image areas on the drum because of the developing bias. Thus, if the developing bias were to fail, the residual charge would attract the toner so that a background would appear in the non-image areas of the copy.

Step-5: Transfer

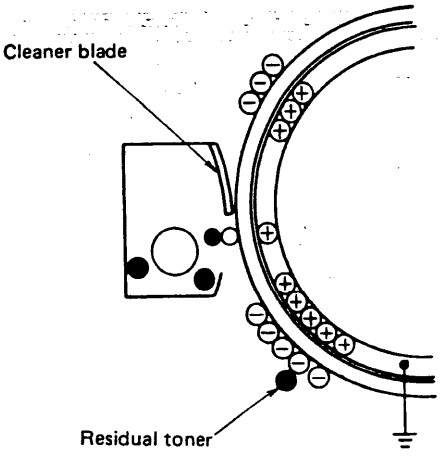
The visible image on the drum surface is transferred onto the copy paper by applying a negative charge from the transfer corona to the back of the copy paper.

As the transfer effect is 70 to 80%, 20 to 30% of the image remains on the drum (residual toner) even after the transfer.



Step-6: Cleaning

Toner remaining on the drum is collected by the cleaner blade and stored in the toner collecting container.



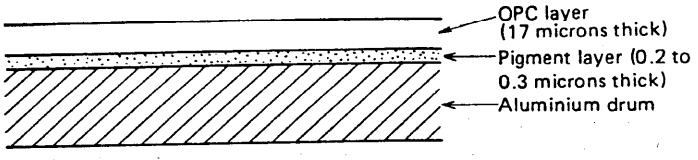
Step-7: Discharge (same as Step-1)

Step-8: The transferred image is fixed permanently on the copy paper by the action of the fuser unit through a combination of heat and pressure, the toner is fused into the copy paper.

4. Photoconductor

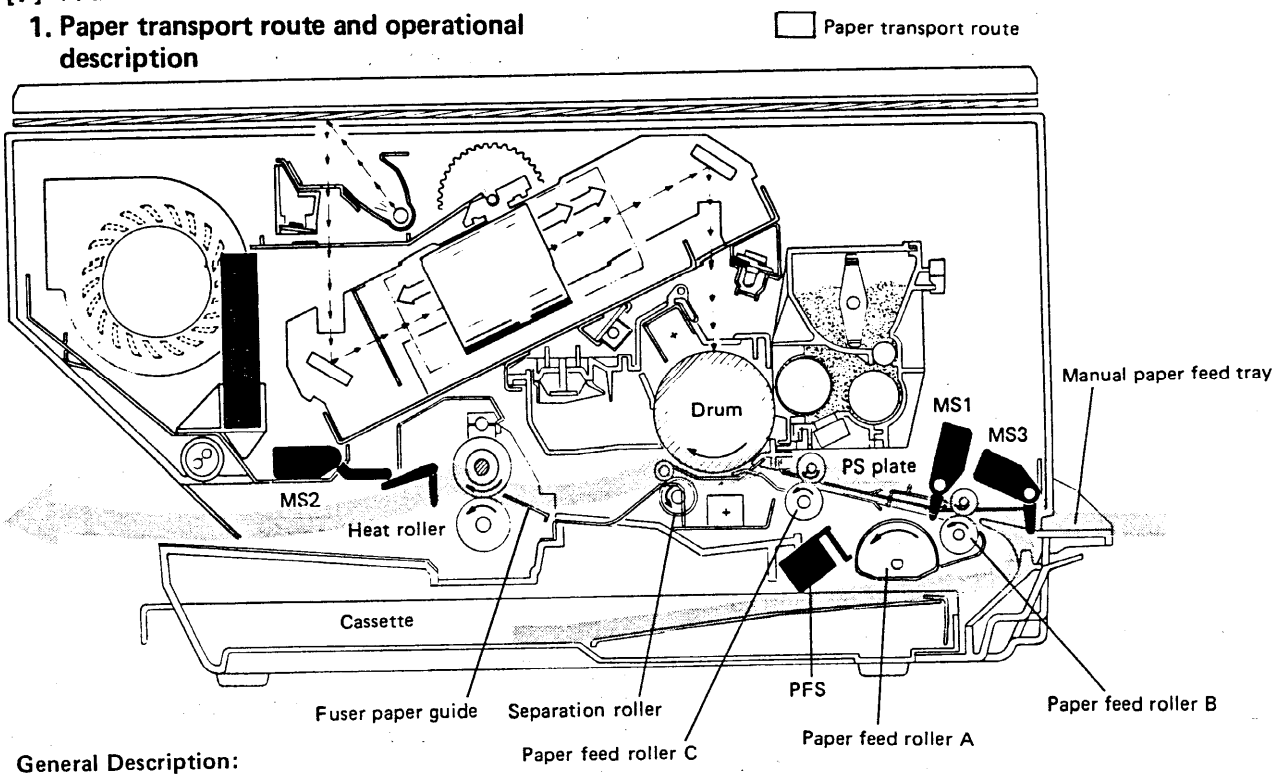
An OPC drum is used for the photoconductor.

(Structure of the OPC drum layers)



[7] PAPER FEED AND TRANSPORT SECTION

1. Paper transport route and operational description



General Description:

Copy paper is introduced into the copier in one of two ways, from the supply of paper in the cassette or manually through the by-pass. The cassette holds approximately 100 sheets of copy paper.

The cassette supplied with the copier may be loaded with either 81/2 x 14", 81/2 x 11" (A4) or 51/2 x 81/2" (A5) copy paper.

The Separator Tabs in the cassette ensure that only one sheet is fed at a time.

The copy paper is fed out of the cassette by Paper Feed Roller A. These rollers make one rotation for each sheet of paper. The rotation of the feed rollers is controlled by the Paper Feed Clutch (a Spring Clutch) and Paper Feed Solenoid. When the Print Button is depressed, the Main PWB energizes the Paper Feed Solenoid (PFS). When the solenoid arm retracts, it releases the spring clutch and allows the Paper Feed Roller A to make one(1) rotation. The rotating Paper Feed Rollers pick up the top sheet of copy paper and start the paper moving into the copier.

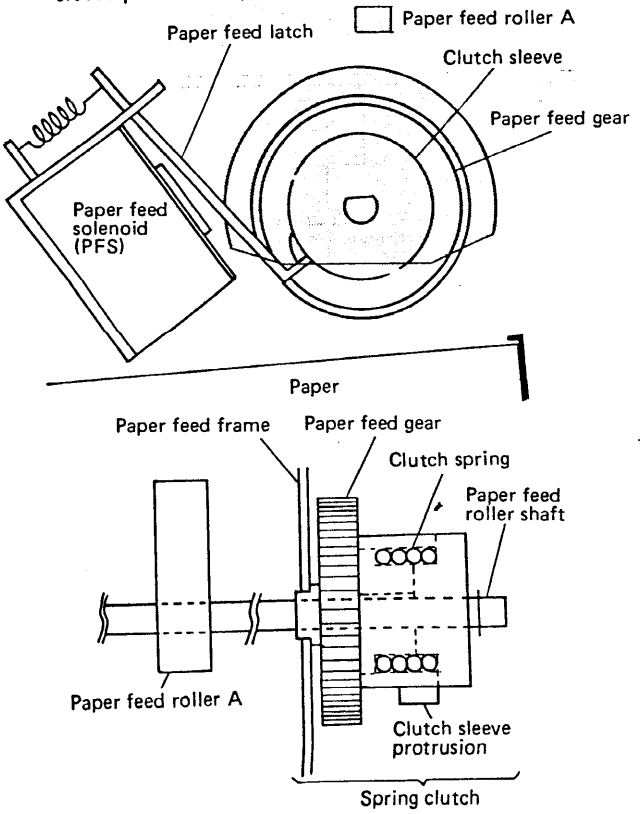
The copy paper is transported to paper feed roller B and trips the paper entry sensor MS1. The lead edge of the copy paper contacts the paper stopper plate. The PS sensor block (located on the original table) lifts the paper stopper plate and allows the copy paper to continue through the paper guide to paper feed roller C. The copy paper passes between the transfer corona and the drum and the image is transferred to the copy paper. The remove tape strips the copy paper from the drum and the separation roller transports it to the fuser rollers. The fuser rollers transport the copy paper, tripping the exit sensor MS-2, to the exit tray.

During manual feed the inserted paper actuates the manual feed paper entry sensor MS-3 and the main motor turns ON. The paper is then transported by paper feed roller B until the lead edge contacts the PS plate. The rest of the paper transport operation is the same as described for the cassette feed. There is no need to push the print switch during the manual feed operation.

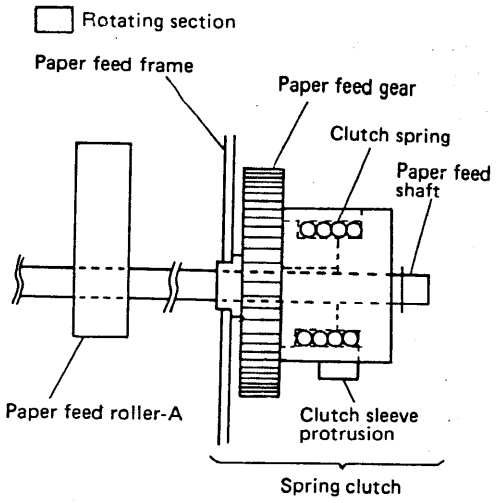
The following discusses cassette feed and manual feed operations.

A. Operation during cassette feed

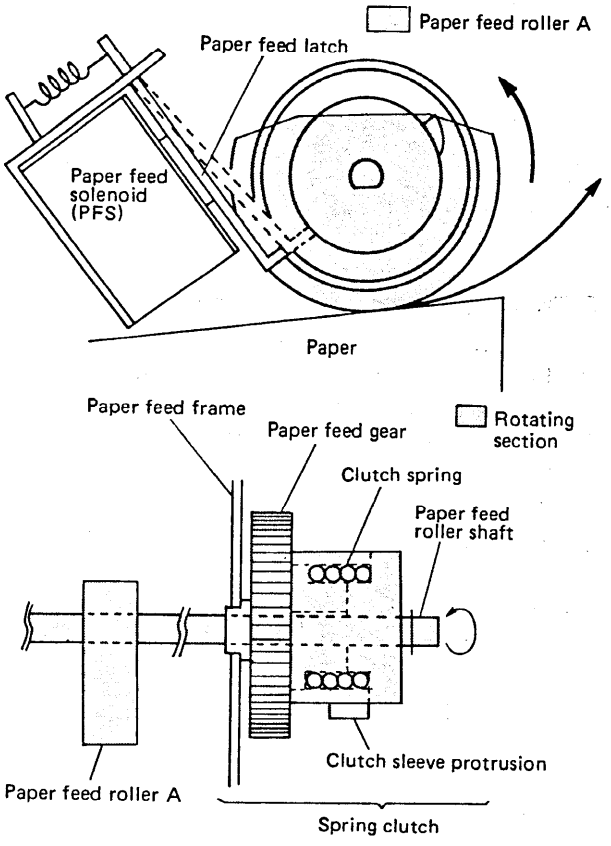
① The illustration below shows the relationship between paper feed roller A, paper feed clutch sleeve, and the paper feed latch locations when the copier is at an initial state before the PRINT switch is pressed and after the READY lamp is ON.
(The paper feed latch is in contact with the clutch sleeve protrusion.)



② At the moment the PRINT switch is pressed, the drive motor starts to turn the drive gears. The paper feed gear also starts to be driven, but the rotation of the gear is not conveyed to the paper feed roller shaft and the paper feed roller does not rotate because the paper feed latch is holding the clutch sleeve protrusion.

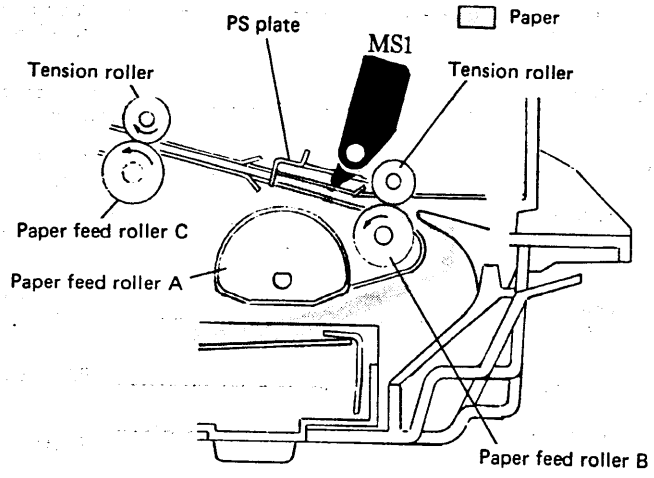


③ 0.9 seconds after the start of the main motor, the paper feed solenoid (PFS) actuates momentarily so that the paper feed latch disengages from the clutch sleeve protrusion. Now, the rotation of the paper feed gear is conveyed to the paper feed roller shaft so that paper feed roller A starts rotating to feed the paper.

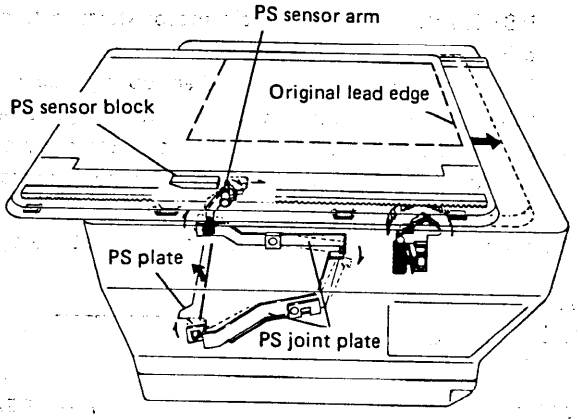


④ After paper feed roller A makes one full turn, the clutch sleeve protrusion is again caught by the paper feed latch so that paper feed roller A stops rotating.

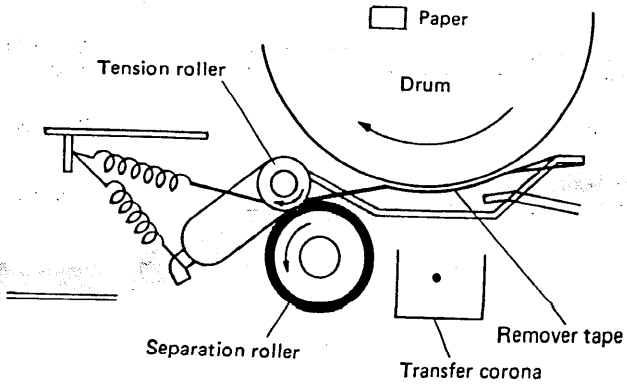
⑤ Meanwhile, the paper fed into the machine is transported to paper feed roller B and the paper entry sensor (MS1). There, the paper is held temporarily by means of the PS plate, in order to synchronize with the lead edge of the image on the drum. Since paper feed roller B continues to rotate, the paper will be evenly pressed against the PS plate to correct for any paper feed skew.



⑥ As the original table starts to move, the P.S plate is mechanically raised.

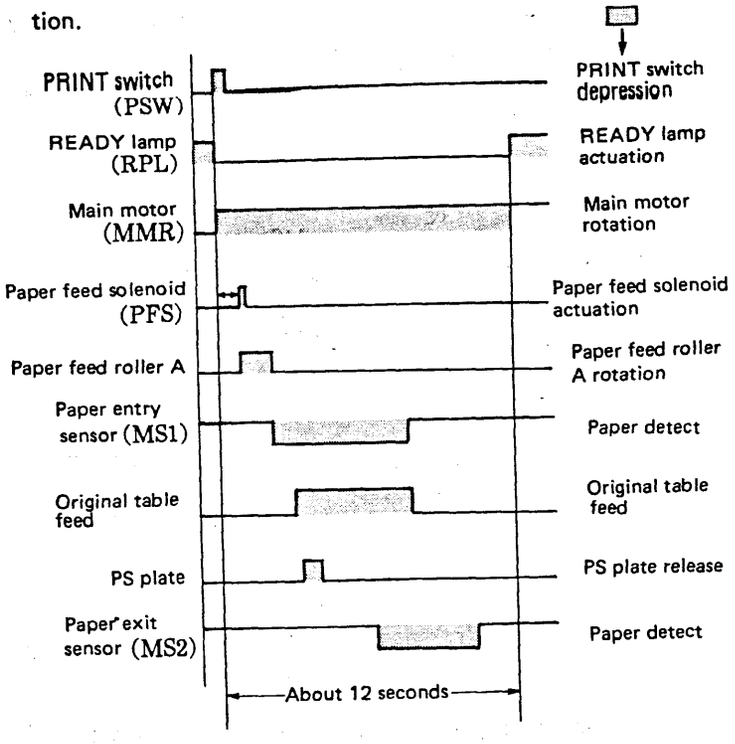


⑦ After the PS plate has been released, the paper is transferred to the transfer unit via paper feed roller C. The paper is separated from the drum by the remover tape and the separation roller.



⑧ The paper separated from the drum is transported to the exit tray through the fuser paper guide, fuser heat roller, and the paper exit sensor (MS2)

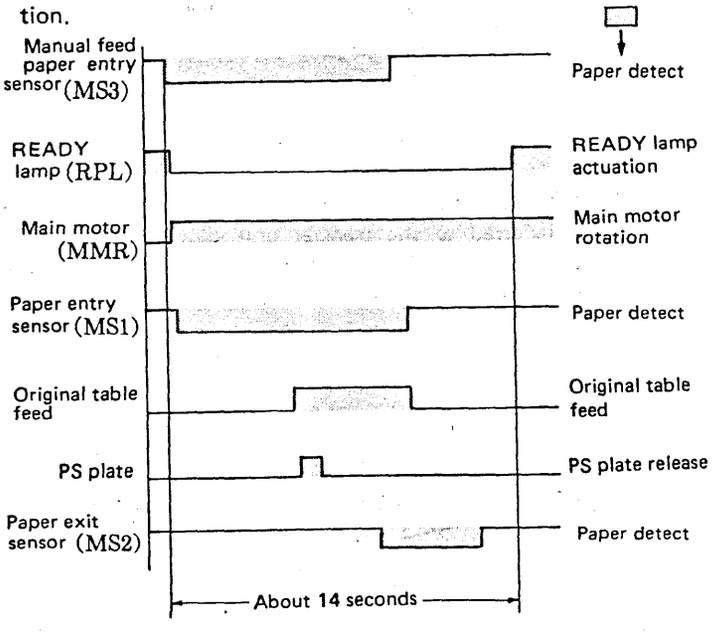
The following shows the timing chart for the above operation.



B. Operation during manual feed

① When paper is inserted in the manual paper feed tray, MS3 is actuated and the main motor starts to turn the drive gears.
The paper inserted is then taken up by paper feed roller B and is transported until its lead edge comes in contact with the PS plate. The rest of the copy paper operation is identical to the cassette feed operation described in: (A-⑤ ~ ⑧)

The following shows the timing chart for the above operation.



C. Condition to establish a paper misfeed

① At power on
If MS1 or MS2 on at power on.

② Manual paper feed
If the MS1 were to fail to actuate within 3 seconds after the actuation of the MS3.

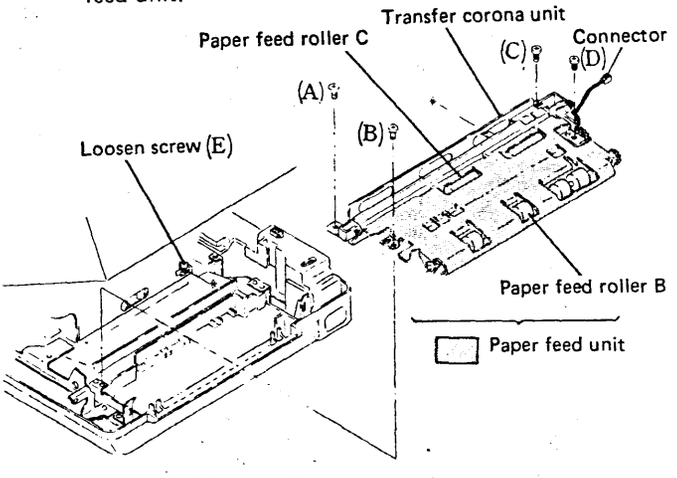
③ In the course of copying
a. If the paper lead edge does not actuate MS2 within 2.3 seconds from the first actuation of MS5 after the table started to advance.
b. If MS2 is still actuated in 1.4 seconds after the discharge lamp turned off at the last copy in the single copy or multicopy mode.
c. If MS1 is not actuated at the time that PFS turns on, during cassette paper feed.

2. Major component removal

A. Paper feed unit

① Turn the copier OFF and disconnect the power cord from the wall outlet.

② Open the upper frame, disconnect the paper feed solenoid connector, remove the paper feed unit holding screws (A ~ D). Loosen screw E, and remove the paper feed unit.

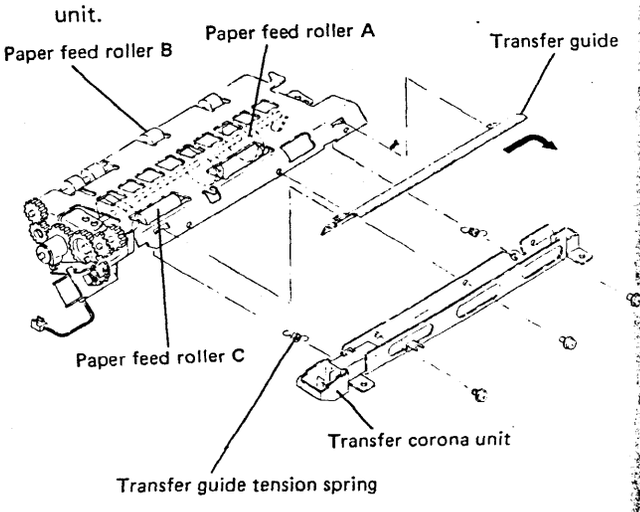


B. Transfer guide, transfer corona unit

① Remove the paper feed unit (A-①).

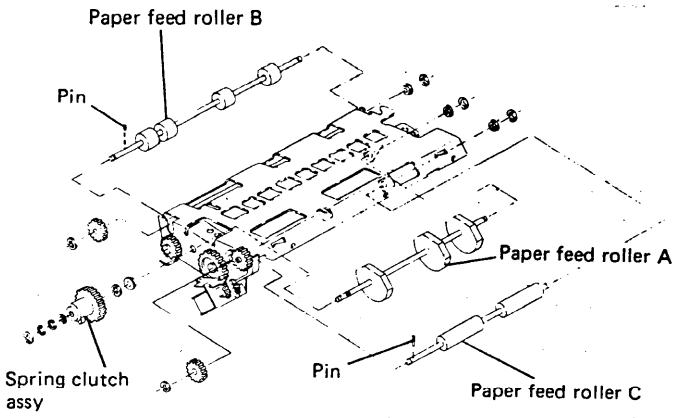
② Remove the two transfer guide tension springs from the paper feed unit, then remove the transfer guide.

③ Remove the three transfer corona securing screws from the paper feed unit, then remove the transfer corona unit.



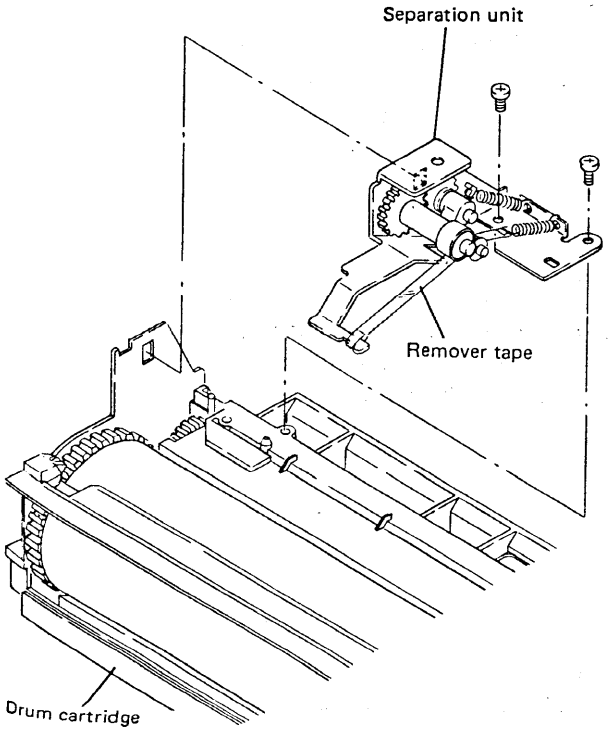
C. Paper feed rollers, A, B, C

① Remove the paper feed unit (A-①).
② Remove the transfer guide and the transfer corona unit from the paper feed unit (B-① thru ②).
* This is done to prevent breaking the corona wire.
③-a Remove the E-ring, spring clutch unit, and bushing from paper feed roller A. Then remove paper feed roller A. Note that adjustment is required when replacing.
③-b Remove the E-ring, gear, pin, and bushing from paper feed roller B. Then remove paper feed roller B.
③-c Remove the E-ring, gear, pin, and bushing from paper feed roller C. Then remove paper feed roller C.

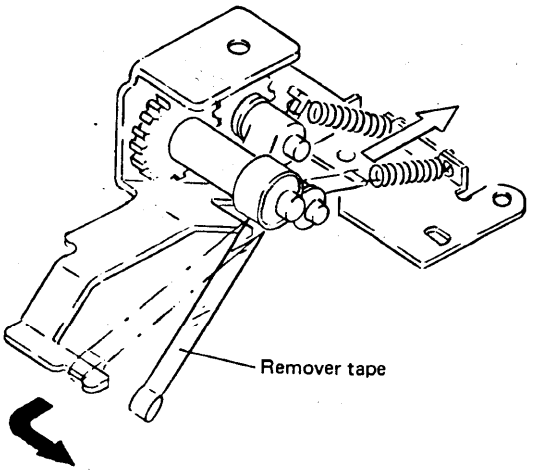


D. Remover tape

① Open the upper frame, then remove the TD cartridge and the drum cartridge.
② Remove the separation unit from the drum cartridge.
CAUTION: Do not expose the drum cartridge to direct sunlight.

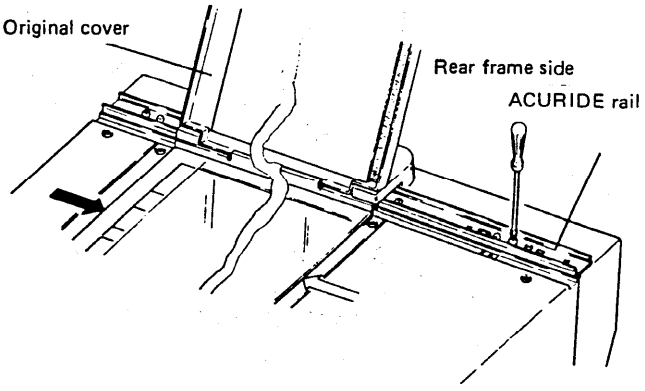


③ Remove the remover tape from the separation unit.

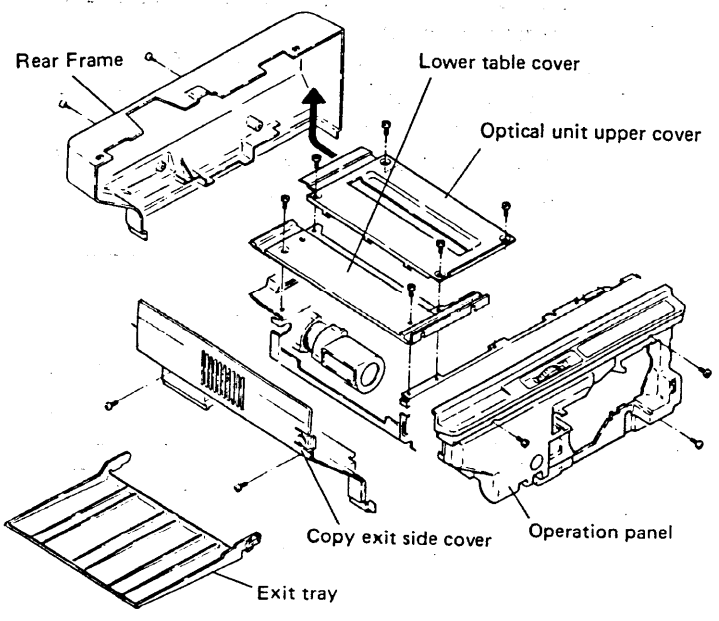


E. Removal of the MS2

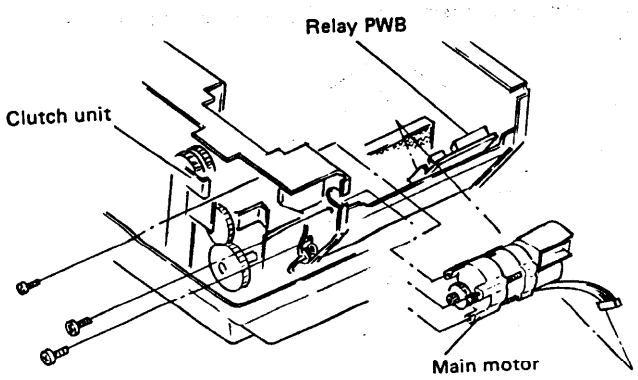
① Remove the ACCURIDE fixing screws (3 screws) and remove the table unit.



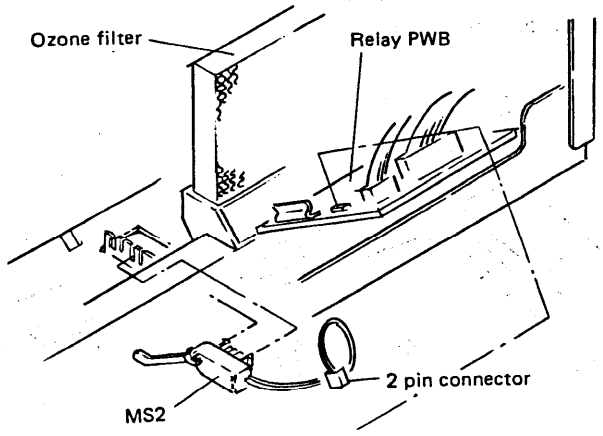
② Remove the covers.



③ Remove the 3 screws holding the main motor in place.
④ Disconnect the 6 pin connector which is connected to the relay PWB, then remove the main motor.

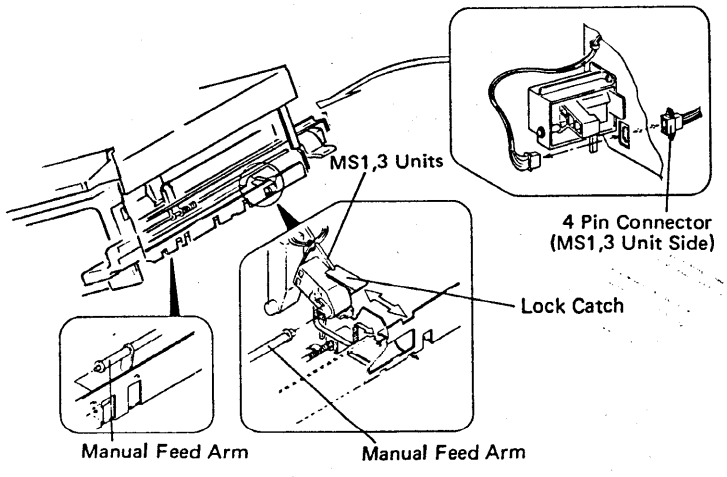


⑤ Disconnect the MS2 2 pin connector which is attached to the relay PWB.
⑥ Press on both sides of MS2 fixing hook and remove MS2.



F. Removal of the MS1 and MS3 Units

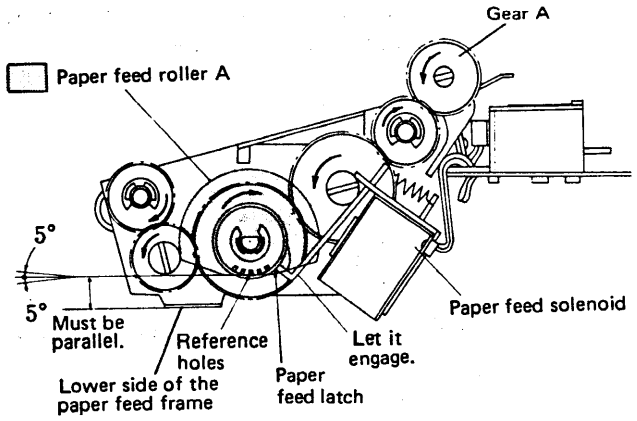
① Open the Upper frame and remove the rear cover and the paper feed side cover.
② Disconnect the 4 pin connector on the rear frame side.
③ Disconnect the lock catch of MS1,3 units from the frame and lift out the units.
* When MS1, 3 units are removed, the manual feed arm which is connected to MS3 will be disconnected.



3. Adjustments

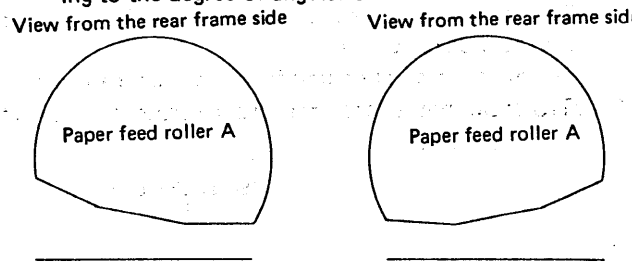
A. Paper feed roller A location (angle)

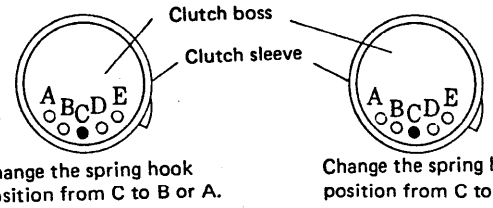
(Check procedure)
① Remove the paper feed unit from the copier (2-A-①).
② Turn gear in the arrow direction unitil the clutch sleeve protrusion comes into contact with the paper feed latch.
Make sure that the lower side of paper feed roller A is parallel to the lower side of the paper feed frame. The tolerance is 0±5°.



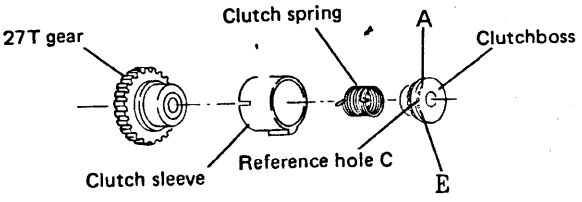
(View of the paper feed unit from the rear frame side)

(Adjustment procedure)
① Check the angle of paper feed roller A.
② Change the hook position of the clutch spring according to the degree of angular deviation.




Clutch boss
Clutch sleeve
A B C D E
A B C D E
Change the spring hook position from C to B or A.
Change the spring hook position from C to D or E.

②-a Remove the spring clutch assy (2-C-③-a).
②-b Disassemble the spring clutch assy and change the hook position of the spring.

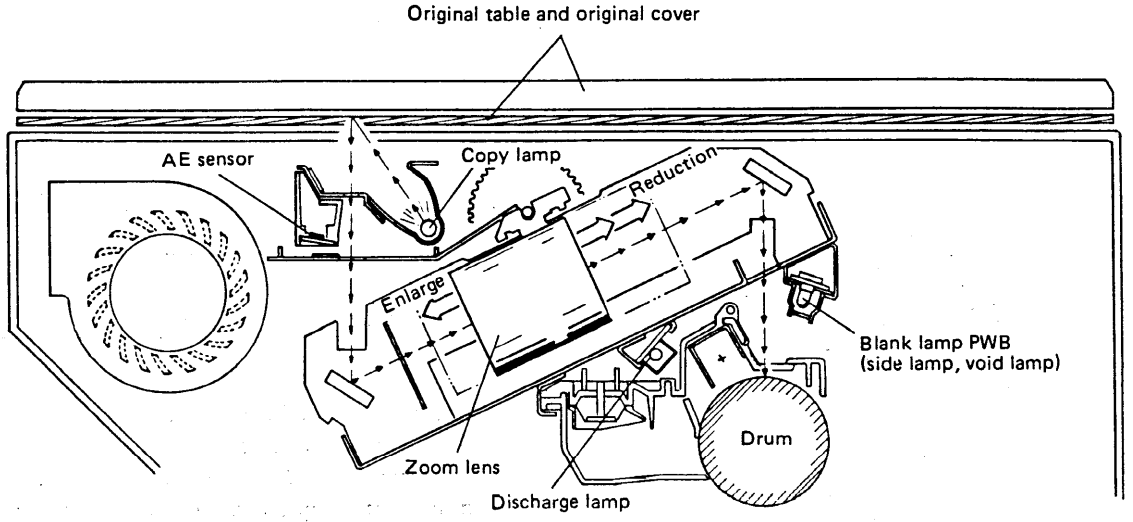


* When reassembling the clutch, lube the clutch spring with grease (UKOG-0062FCZZ).

[8] OPTICAL SYSTEM

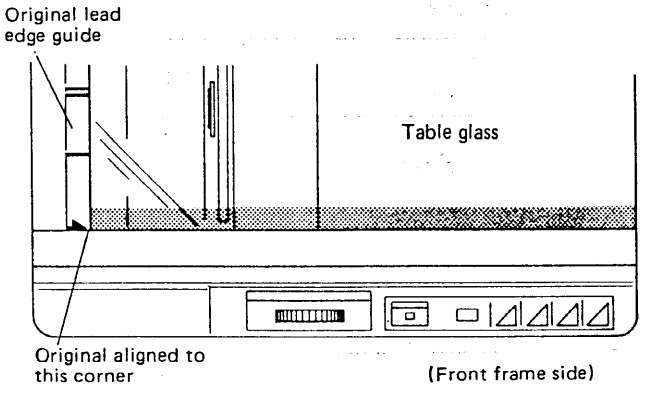
1. General Description

- As a zoom lens is used in the optical unit, magnification ratio can be varied by changing the zoom lens location, without changing the original to drum distance. There are choices of four magnification ratios which can be attained by changing the dial position: enlarge (x1.24), normal (x1.00), reduce (x0.8, x0.07).
- Exposure is controlled by varying the copy lamp drive voltage.
- An automatic exposure sensor (photo-diode) is used in the optical system for sensing contrast in the original. Contrast of the original is determined by the automatic exposure sensor which receives the copy lamp light reflected from the original and the copy lamp intensity is controlled according to the contrast of the original thus detected.
- Moving table method is used for exposure.



A. Original table

The original must be set in alignment to the front left corner of the original table. An image loss appears in the shadowed area because of paper separation.

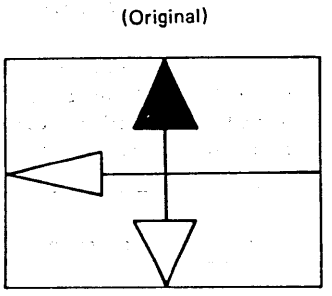


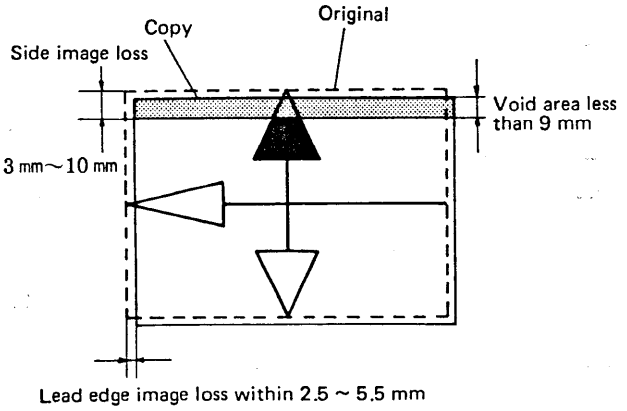
Void area and image loss

(1) Void area
Make an all toned copy with the original cover left open. The area of the paper copied white is called void area.

(2) Image loss
Indicates the rate (or area) of image lost on the copy.

(3) Void area and image loss limits



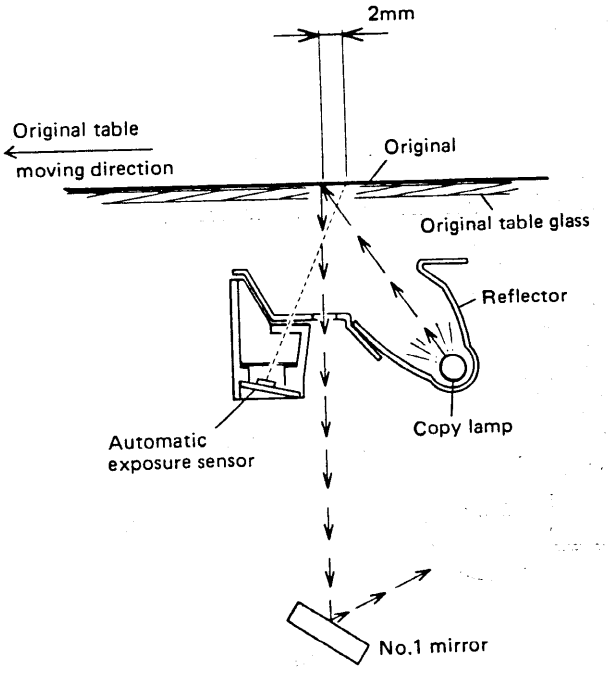


Void area	Lead edge	None
	Side	9mm, max.
Image loss	Lead edge	2.5mm ~ 5.5mm
	Side	3mm ~ 10mm

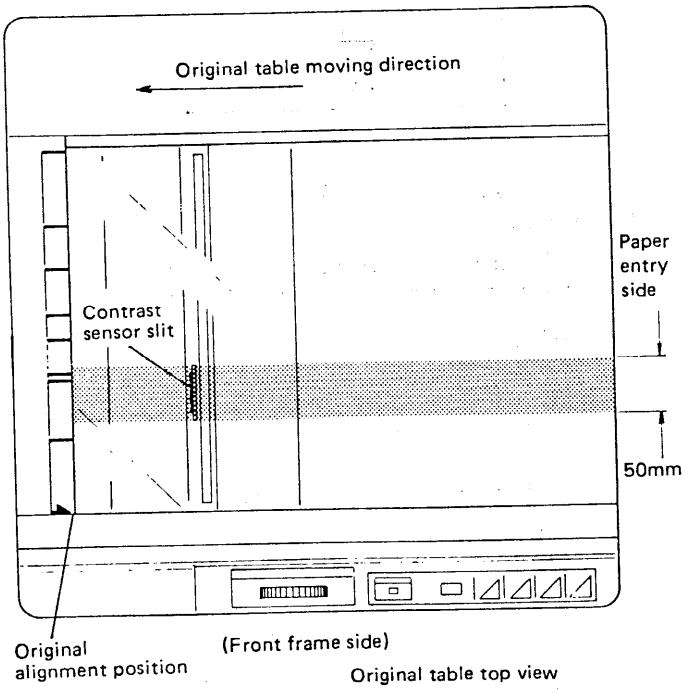
B. Light source unit

1) Copy lamp
285W for the 100V series machine
285W for the 200V series machine

2) Automatic exposure sensor (AE)
Copy lamp light reflected from the original is sensed by the automatic exposure sensor, which is sent to the CLR PWB to control the copy lamp intensity.



As the sensor is installed in the center of the 50mm slit, the contrast of the original is sensed within this 50mm area. (See the shadowed area in the figure below.) For the original out of this area, the automatic exposure control function will not apply.



Original table top view

C. Lens unit

1) Mirrors
One mirror is installed on either side of the lens. The mirror is not movable as a zoom lens is used.

2) Lens
A through type zoom lens is used.

3) Lens location sensor switch PWB
Used to find the lens location in the magnification copy mode, to send signal to the main PWB.

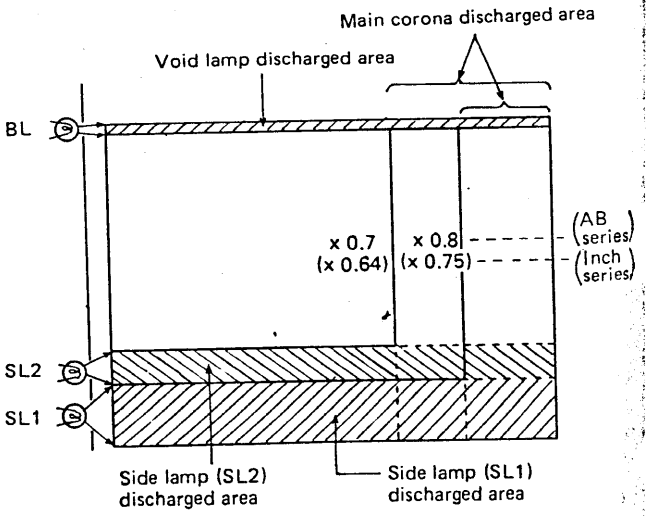
Magnification ratio vs. signal (from lens location sense switch)

Magnification ratio	LS1	LS2	LS3	LS4
x 1.24	ON	–	–	–
x 1.00	–	ON	–	–
x 0.80 (x 0.75)	–	–	ON	–
x 0.70 (x 0.64)	–	–	–	ON

4) Blank lamp PWB
The blank lamp PWB consists of the side lamps (SL1, SL2) and the void lamp (BL). In reduction mode the light from the side lamp(s) is exposed to the area of the drum surface not exposed by the copy lamp light reflected from the original. This prevents toner from being applied to the drum in this area. The light from the void lamp (BL) is exposed over the area of the drum that comes in contact with the remover tape, discharging and preventing toner attraction to the void area.

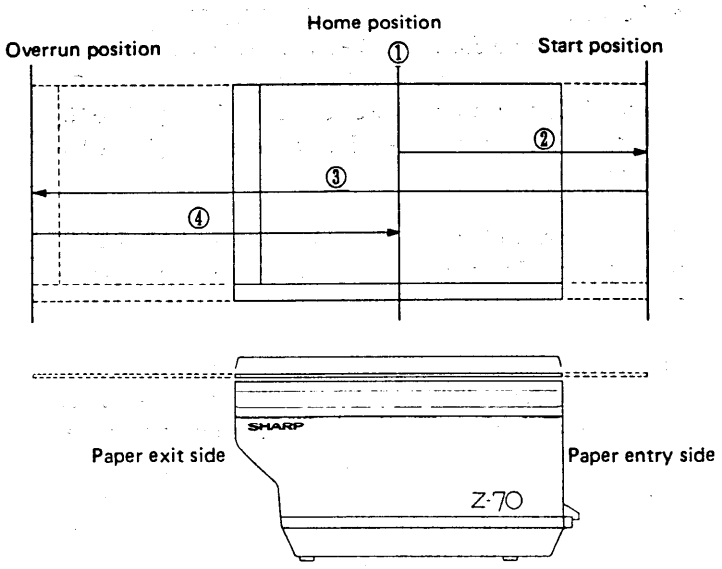
Side lamp activation

Magnification ratio	SL1	SL2
x 0.8 (x 0.75)	ON	OFF
x 0.7 (x 0.64)	ON	ON



2. Original table driving

The original table is driven by the table drive gear train and the direction select magnetic clutch.



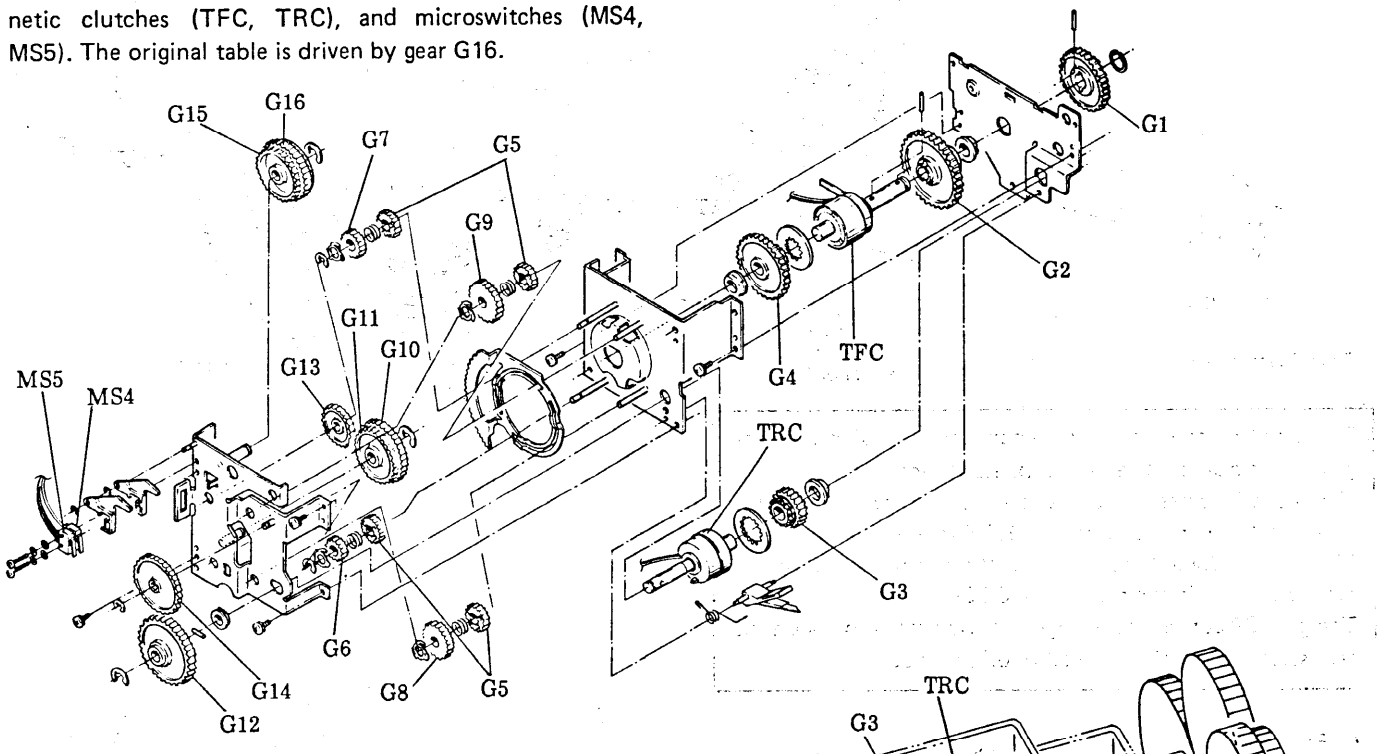
A. Table movement

(1) The original table stops on the home position which is located in the center.
(2) The original table moves to its starting position (paper entry side).
(3) The original table moves towards the paper exit side while making exposure.
(4) The original table returns from the overrun position and stops at the home position.

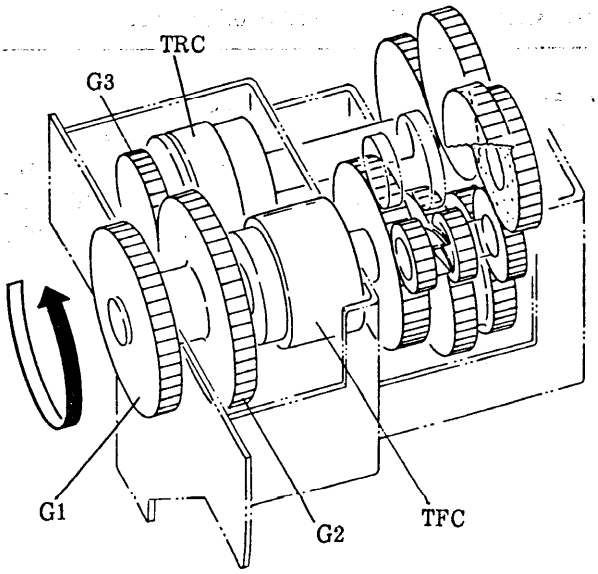
In the multicopy mode, the original table returns from the overrun position to the start position, and starts the process again.

B. Structure of the table drive clutch unit

The clutch unit consists of the gears (G1 thru G16), magnetic clutches (TFC, TRC), and microswitches (MS4, MS5). The original table is driven by gear G16.



View of the drive clutch unit from the rear frame side



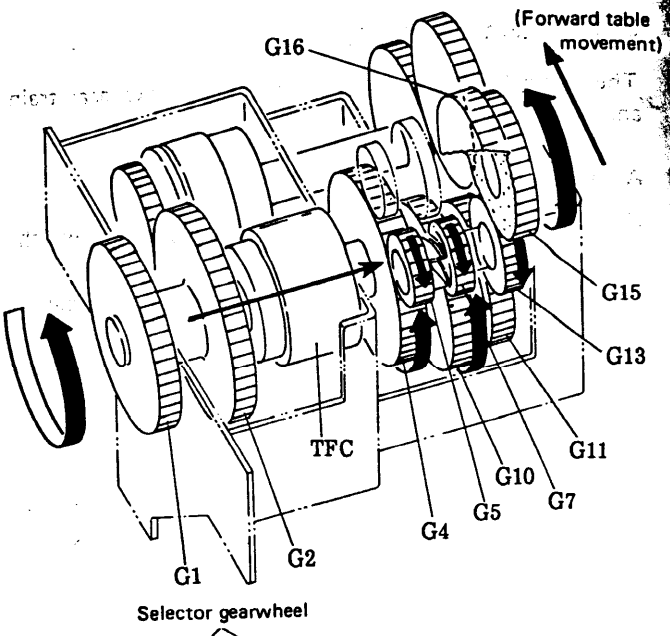
C. Clutch unit operating theory

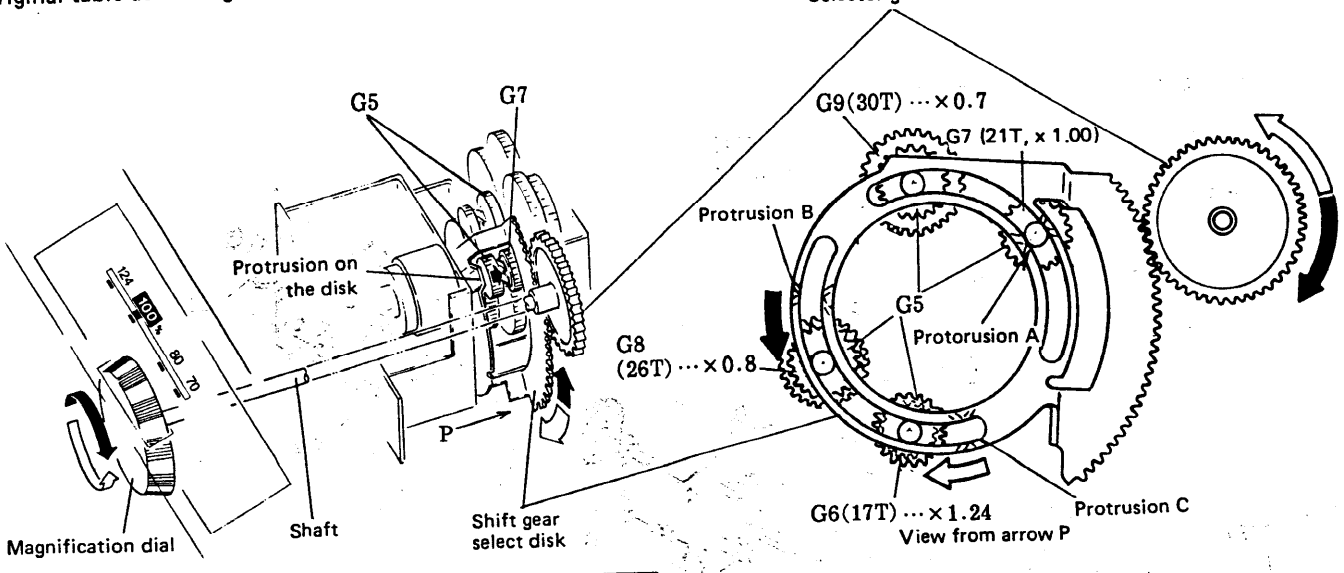
- When the original table is at rest (TFC & TRC are OFF) Since the magnetic clutches (TFC, TRC) are not active, drive from the main motor is conveyed only to gears G2 and G3 from G1 so that the original table stays at home position.

- Forward table movement (TFC ON, TRC OFF)
  When the magnetic clutch TFC is active, the power from the main motor is conveyed to the gear G4 via G1, G2 and TFC, then to gears G5, G7, G10, G11, G13, G15, and finally to the gear G16 to drive the original table forward.

It is possible with the Z-70 to produce an enlarged or reduced copy. The original table driving speed is changed in the following process.

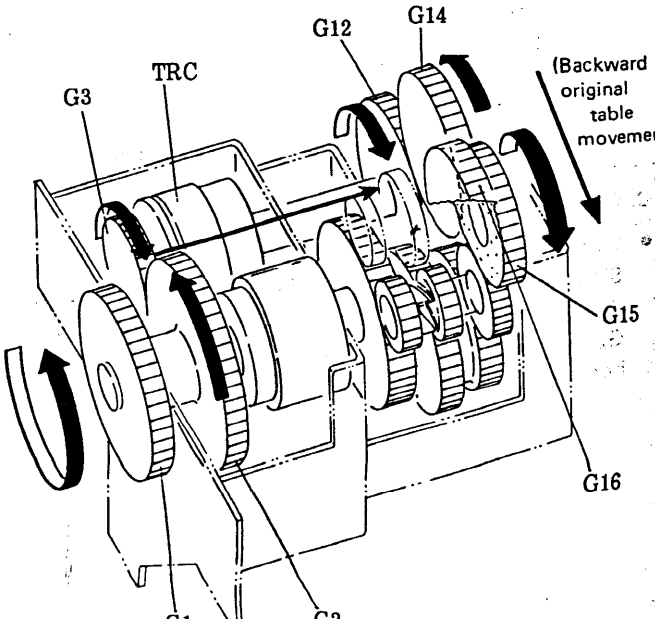
The magnification ratio select dial is connected with the selector gearwheel via a shaft. When the dial is set to the desired magnification size, the selector gear wheel moves the shift gear select disk. The protrusion on the selector disk pushes up the gear 15 to be connected with the given shift gear (G6 to G9), through which drives the original table according th the given speed.





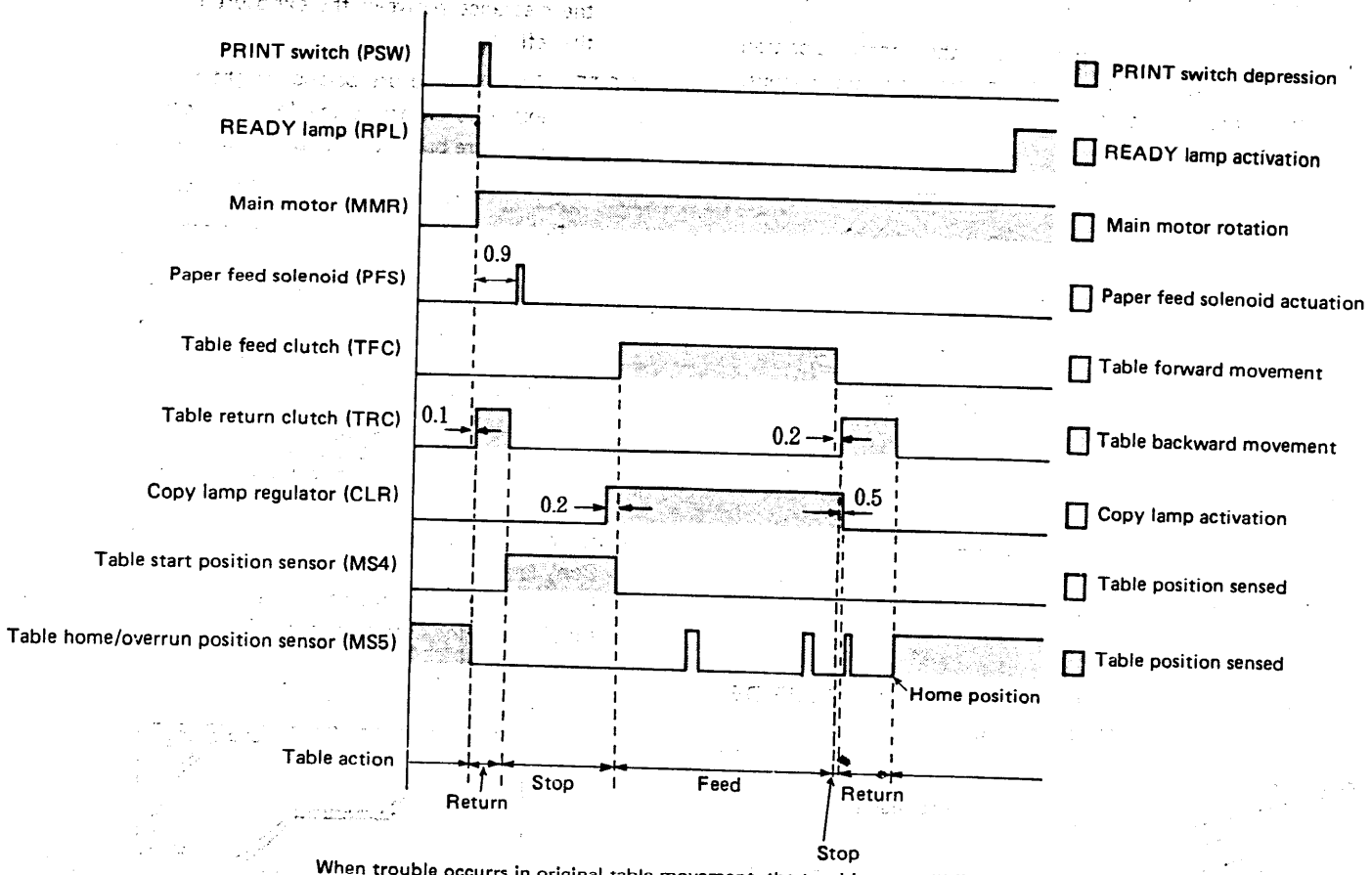
The gear G6 comes into engagement by protrusion C on the gear select disk in the enlarged (x 1.24) mode.
The gear G7 comes into engagement by protrusion A on the gear select disk in the normal (x 1.00) mode.
The gear G8 comes into engagement by protrusion B on the gear select disk in the reduced (x 0.80) mode.
The gear G9 comes into engagement by protrusion A on the gear select disk in the reduced (x 0.70) mode.

- Backward table movement (TFC OFF, TRC ON)
  The magnetic clutch TRC comes active, the drive power from the main motor is conveyed to G14 via G1, G2, G3, TRC, and G12 which causes G15 and G16 to rotate in the opposite direction to return the table.



3. Optical system operation

A. Time chart (single copy from cassette)



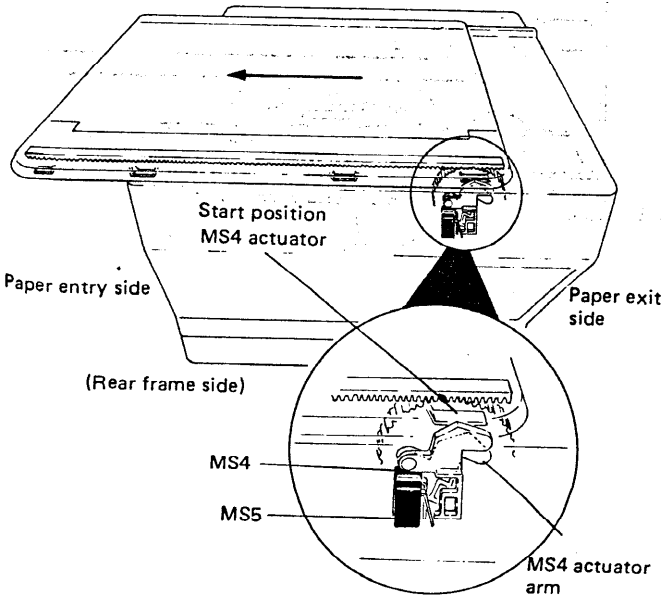
When trouble occurrs in original table movement, the trouble status "L" is displayed in the multicopy number window.

B. Timing explanation

(1) With the depression of the PRINT switch, the main motor starts to rotate the drive gears. At the same time, the TRC (Table Return Clutch) is put into action to move the table to the start position (paper entry side).

(2) When the MS4 is actuated by the actuator, the table stops (start position).

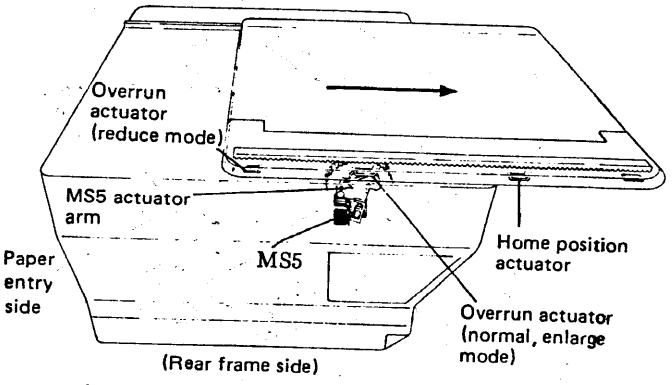
(Start position)



(3) Immediately after activation of the copy lamp (0.2 second), the TFC (Table Feed Clutch) is turned active. Then, the table starts moving forward and exposure is started for the original.

(4) Although MS5 is activated at the table home position while the original table is moving forward, the table continues to advance. At the second activation of MS5 (table overrun position), the TFC is turned off so that the table stops. (Paper exit side)

(Overrun position)

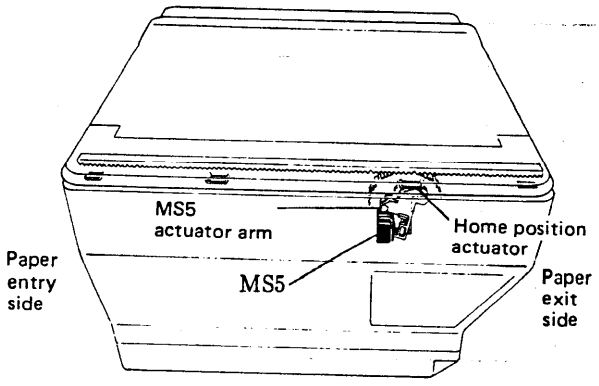


In the reduce mode, the original table continues to advance after the second activation of MS5, and the TFC is turned off at the third activation of MS5 and the table stops (at the final overrun position), using signals from LS3 and LS4.

(5) In 0.2 second after stopping the table, the TRC again comes active so that the table starts to return with the copy lamp turned OFF at the same time.

(6) When MS5 is actuated by the home position actuator during table return motion, the table stops. (table home position).

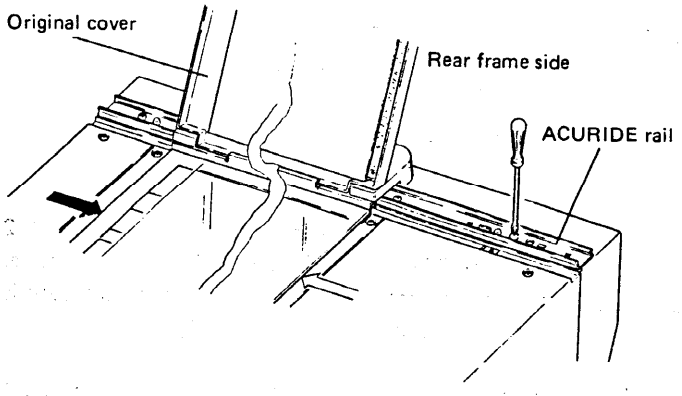
(Home position)



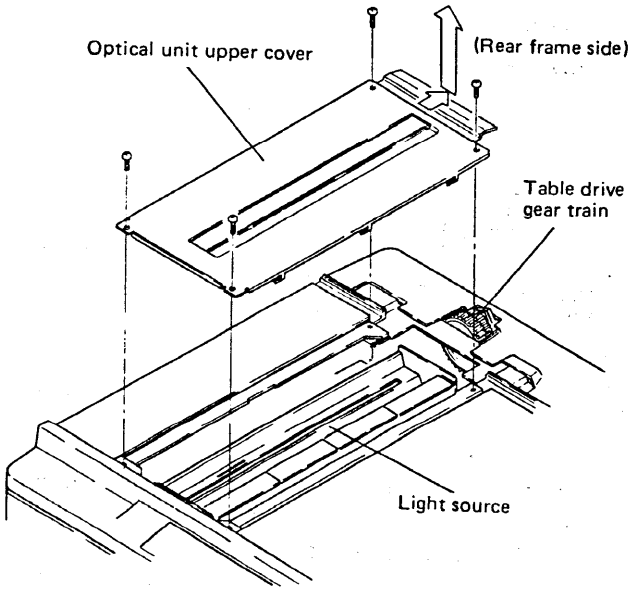
4. Major component removal

A. Copy lamp, thermal fuse

(1) Remove the three screws that hold the ACURIDE rail, then remove the table unit.

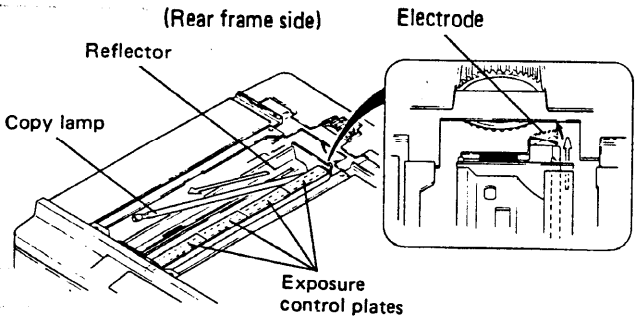


(2) Remove the optical unit upper cover.
Remove the four screws, then slide the cover to the rear frame side to remove.



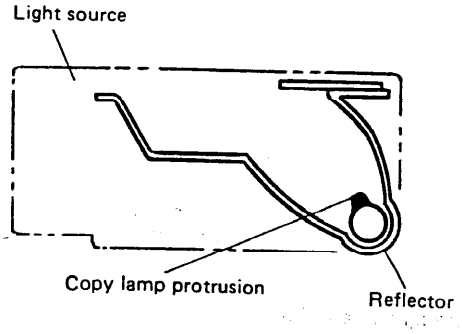
(3) Pull the copy lamp electrode on the rear frame side in the arrow direction A to disengage the lamp from the electrode. Next, take out the copy lamp through the clearance between the exposure control plate and the reflector.

NOTE: For the exposure balance might be affected if the exposure control plate location was changed, the exposure balance must be checked and adjusted.

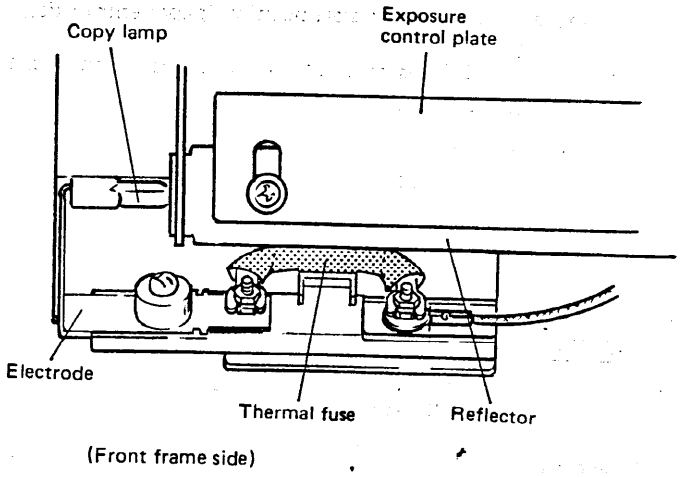


(Installation precautions)

a. Copy lamp
Install the copy lamp so that the protrusion of the lamp should be at the outside of the reflector.

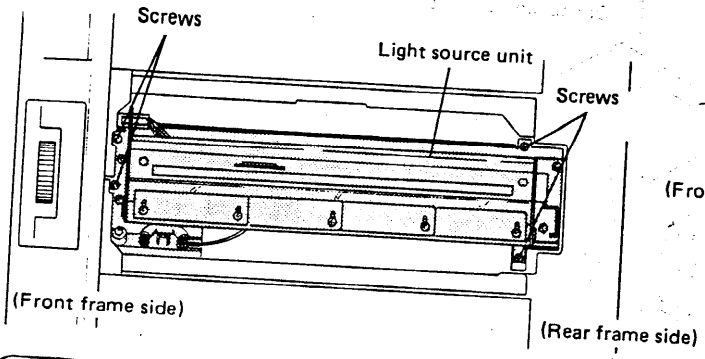


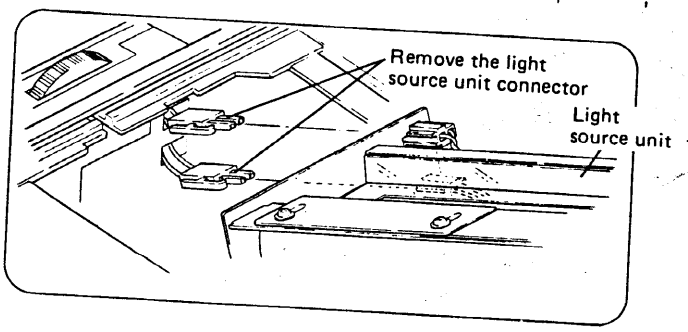
b. Thermal fuse
Install the thermal fuse so that it should be in contact with the reflector.



B. Light source unit

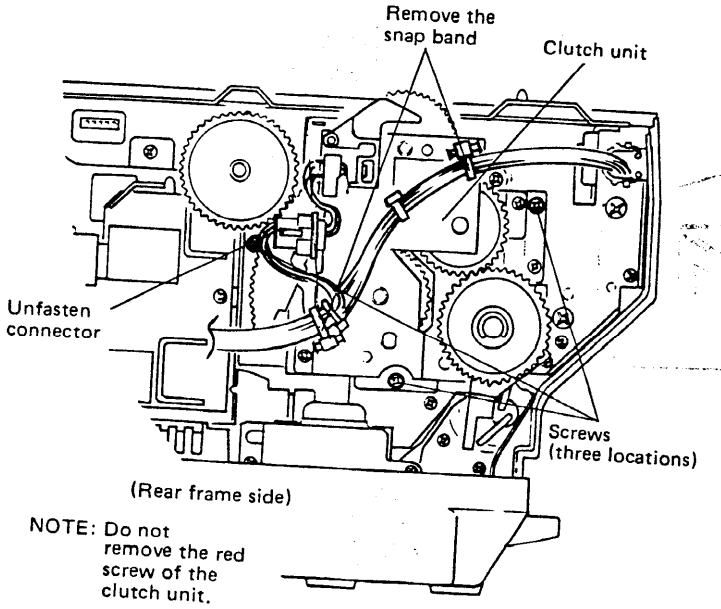
(1) Remove the original table.
(2) Remove the four screws that hold the light source unit.
(3) Lift up the rear frame side of the light source unit and slightly move it to the rear frame side. Unfasten two connector on the front frame side, then remove the light source unit.





C. Table drive clutch unit

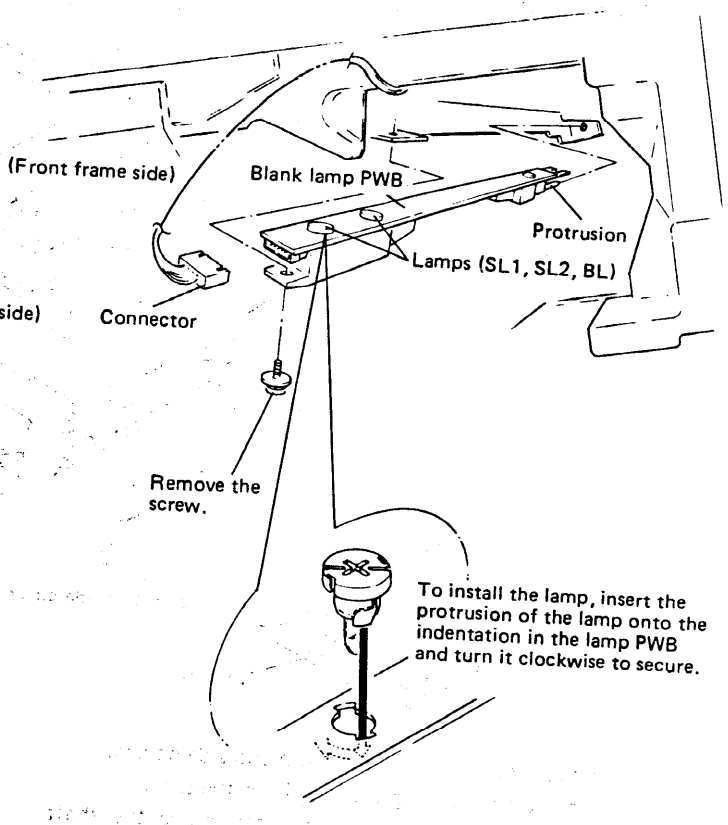
(1) Remove the panel on the rear frame side.
(2) Remove the three screws that hold the clutch unit, unfasten the connector, and remove the clutch unit from the rear frame side.



NOTE: Do not remove the red screw of the clutch unit.

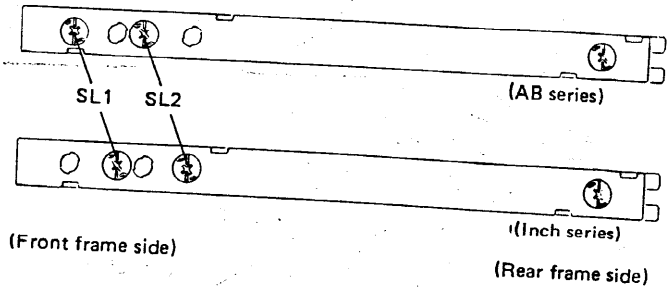
D. Blank lamp PWB

(1) Open the front cover.
(2) Remove the developer cartridge.
(3) Open the top frame and remove the drum cartridge.
(4) Unfasten the blank lamp connector on the front frame side and remove one screw. Then, remove the blank lamp PWB to the front frame side.


(Front frame side)
Blank lamp PWB
Protrusion
Lamps (SL1, SL2, BL)
Connector
Remove the screw.
To install the lamp, insert the protrusion of the lamp onto the indentation in the lamp PWB and turn it clockwise to secure.

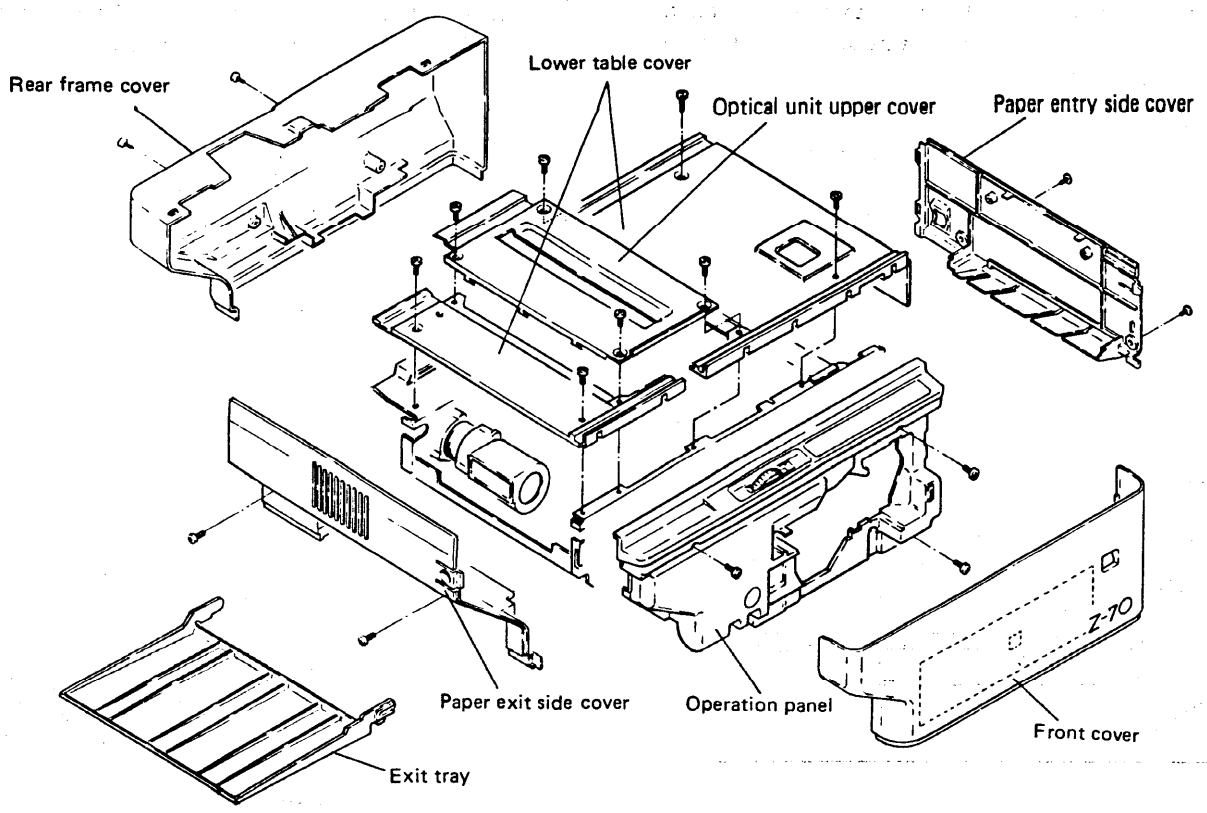
(Precautions)

- Insert the protrusion on the rear frame side of the blank lamp PWB into the indentation. Press it towards the rear frame side after inserting it to secure it. Do not allow the board to warp.
- Note that the side lamps 1 and 2 are installed in different locations on the blank lamp PWB according to AB and inch series.

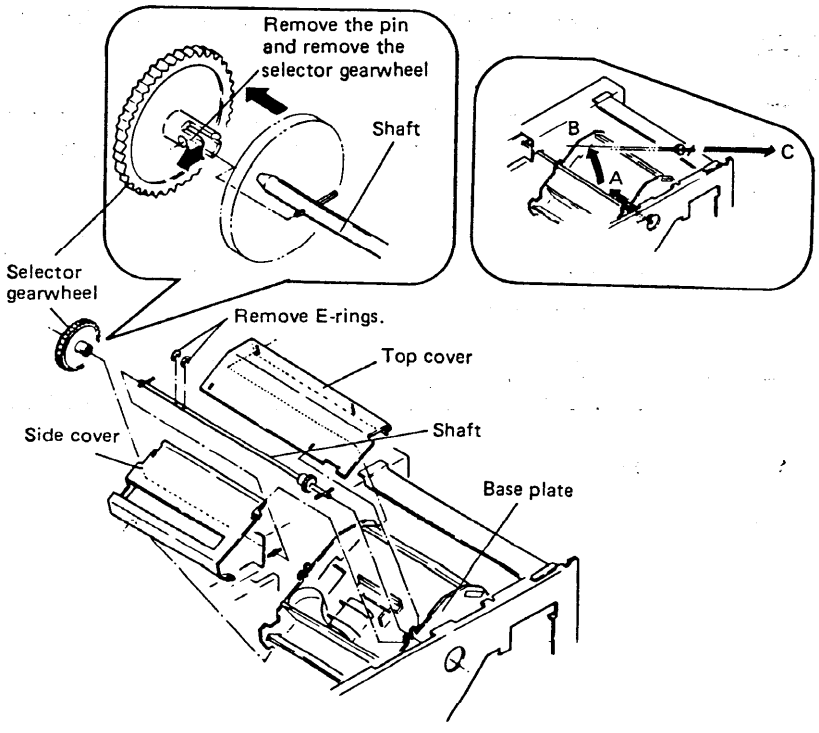


E. Zoom lens assembly

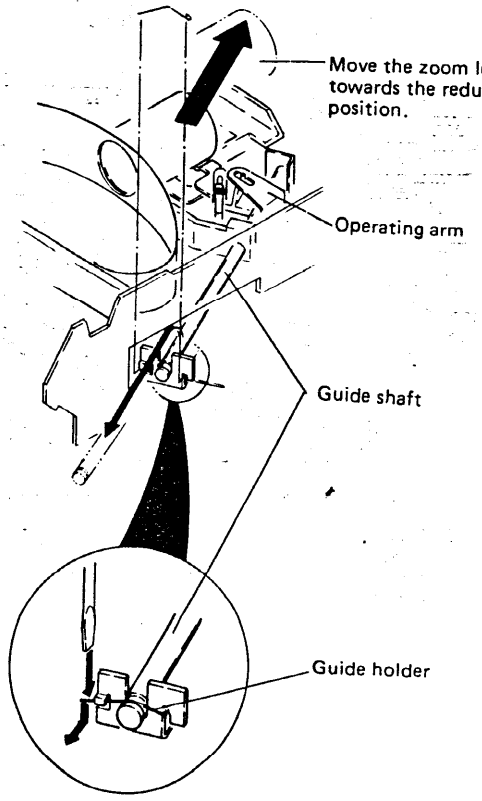
(1) Remove the original table unit.
(2) Remove the external panels (front cover, operation panel, rear frame, exit tray, covers on the paper entry and exit side, and the optical unit upper cover).



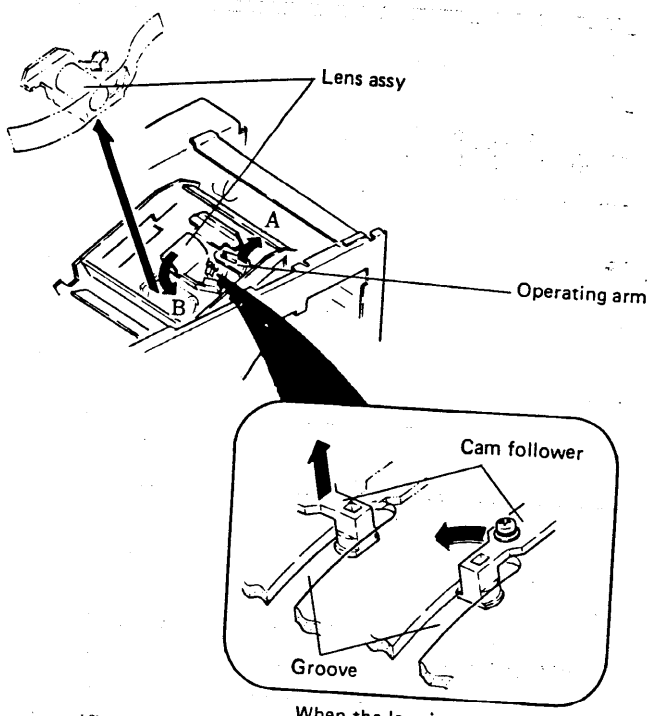
(3) Remove the light source unit, top and side covers.
(4) Remove the slelector gearwheel from the shaft.
(5) Remove twoE-rings from the shaft, move the shaft towards the rear frame side, then remove the cut in the shaft from the base plate. Then, pull it out to the front frame side. (arrowheads, A to B to C)



(6) Move the zoom lens to the reduce (x0.7) position.
(7) Remove the guide holder from the left end of the guide shaft, lift up the shaft, then remove it in the arrow direction.



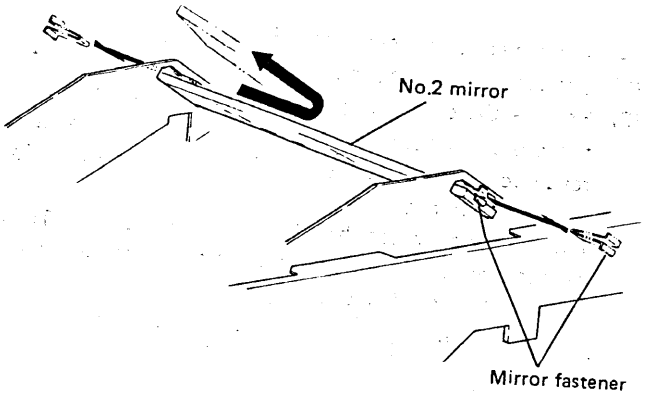
(8) Remove the operating arm from the protrusion on the slide base (arrowhead A).
(9) Rotate the zoom lens in the arrow direction B and remove the cam follower from the groove. Then, remove the lens assembly.



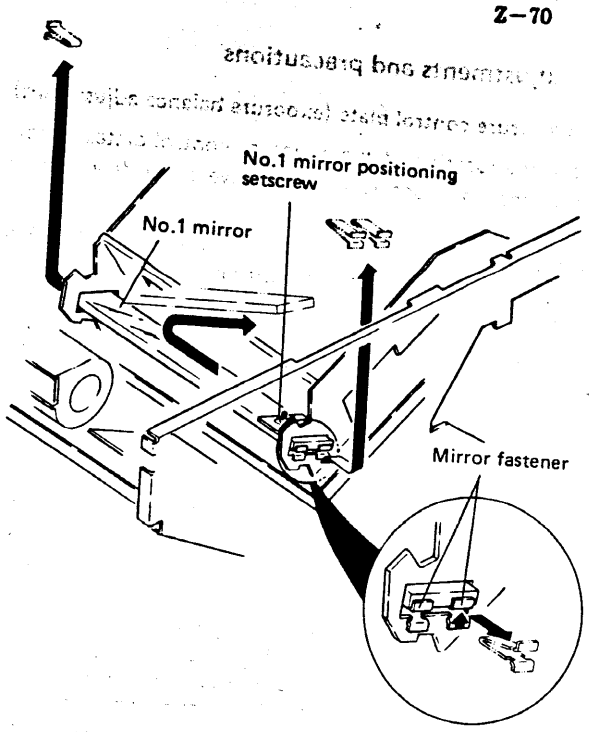
When the lens is rotated, the cam follower also rotates to be disengaged from the groove.

F. Replacing mirrors

Remove the mirror fasteners from both mirror-1 and mirror-2, then remove the mirrors.

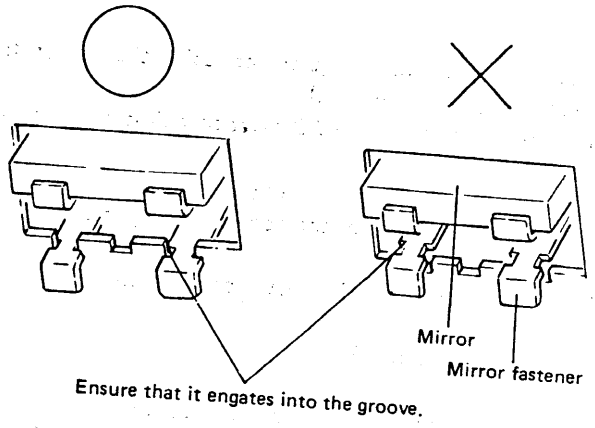


Remove three mirror fasteners for the No.1 mirror.
Remove two mirror fasteners for the No.2 mirror.
Do not move the mirror positioning setscrew in removing the No.1 mirror. Note that it is not possible to adjust it in the field.



(Mirror installing precautions)

(1) The mirrored surface must face the lens to install the mirror.
(2) After installation of the mirror fastener, make sure that the groove in the fastener is properly engaged into the groove.



5. Adjustments and precautions

A. Exposure control plate (exposure balance adjustment)

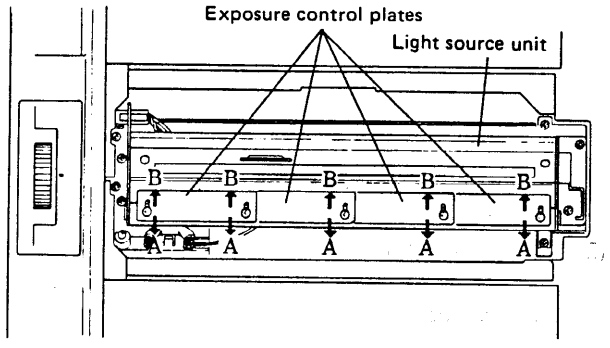
Move the location of the exposure control plates to adjust, when uneven exposure occurs between the front and rear frame sides.

Before the adjustment it is mandatory to check the following to be clean and in good condition.

- Corona wires
- Developing cartridge
- The optical system

(1) Make a half-tone copy in the normal (x 1.00) mode and check the exposure balance.

(2) Move the exposure control plate in the arrow direction A and B to adjust. Moving it in the direction A makes exposure brighter and moving it in the direction B makes exposure darker.



B. Copy lamp intensity adjustment (using the pot on the copy lamp regulator PWB)

The copy lamp regulator PWB must be adjusted for any of the following reasons:

(1) After replacement of the copy lamp.

(2) After replacement of the copy lamp regulator PWB or its component.

(3) After replacement of the (AE) photosensor.

(Adjustment procedure)

- Adjustment in reference to copy quality

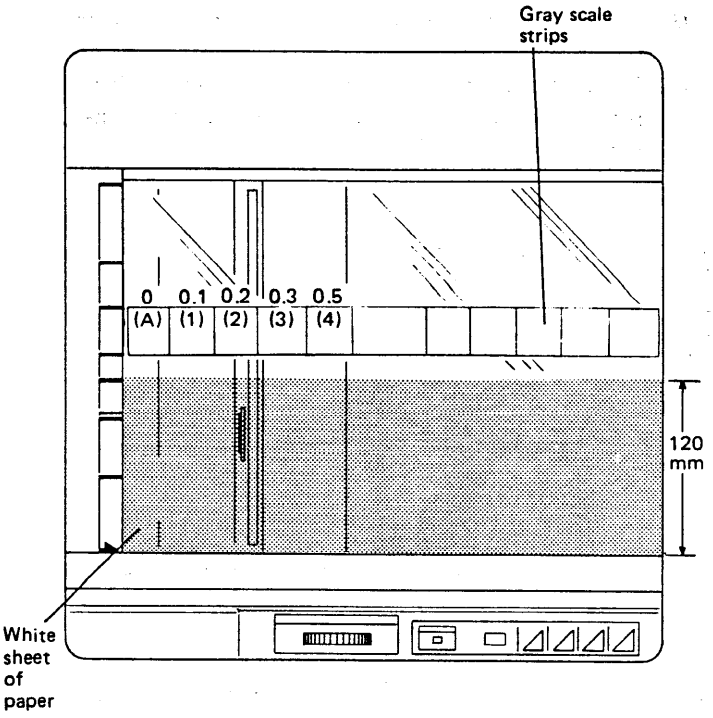
(1) Remove the optical unit, and wipe clean the surface of the (AE) photosensor with a cloth alcohol.

NOTE: Wiping with dry cloth may attract dust.

(2) Replace the optical unit.

(3) Clean the original cover.

(4) Place four sheets of 120mm wide, 290mm long, SHARP brand white paper in alignment to the document index on the front frame side of the original table and place the KODAK Gray Scale or Test Chart (UKOG-0089CSZZ) next to those sheets.



(5) Set the contrast select switch to the dark position.

(6) Make a normal (x 1.00) copy and adjust the potentiometer VR201 (CLR PWB) so that the gray scale area "0" ("A") does not produce background but the area "0.1" ("1") may slightly produce background.

> Turning the VR clockwise lightens and counterclockwise darkens.

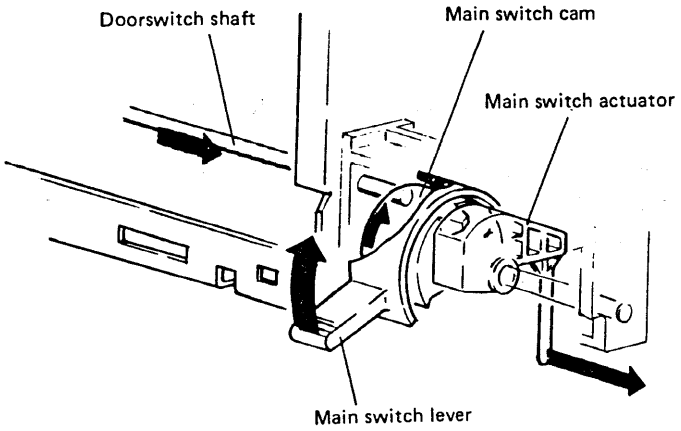
(7) It the adjustment is not achieved using by VR201, move the exposure control plate (Para. 5-A) in either direction A or B to adjust.

- Adjustment of the copy lamp PWB voltage

(1) Unfasten the power supply cable from the wall outlet.

(2) Remove the operation panel and the rear panel. Leave the operation panel connector connected and make it ready to measure the CLR PWB voltage and potentiometer adjustment.

(3) Push the door switch shaft in the arrow direction. Turn on the main switch lever and keep the switch actuated by using a sheet of folded paper.

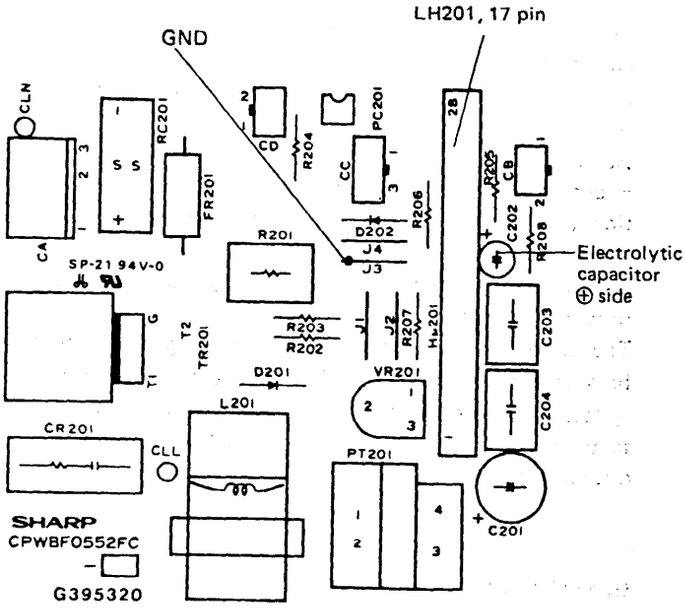


NOTE: *Do not open or close the clam shell mechanism in* the above condition. Otherwise, it may damage the shutter of the main switch.

(4) Fasten the power supply cable to the wall outlet and turn the power on.
(5) Set the contrast select switch to the middle position (auto).
(6) Make a copy without an original on the original table, cover down and adjust VR201 so that the voltage across pin 17 of the CLR PWB IC HI201 or ⊕ side of the electrolytic capacitor C202 and GND (jumper J3) should become 6.3 ±0.4VDC.
(7) If the adjustment has not been achieved by adjusting VR201, move the exposure control plate (Para. 5-A) in either direction A or B to adjust, the amount of light from the copy lamp and adjust again.

After completion of the adjustment, remove the sheet of paper inserted to the main switch before closing the clam shell mechanism. Otherwise, it may damage the shutter of the main switch.

(CLR PWB)

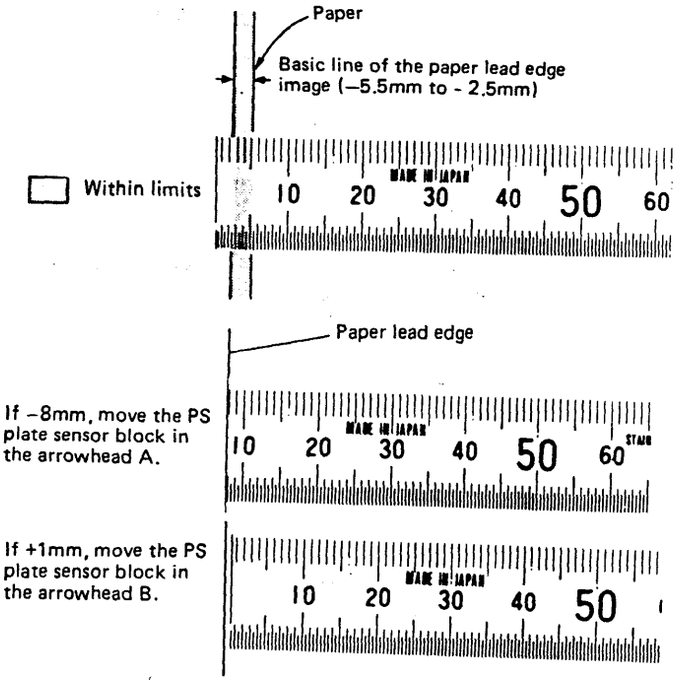


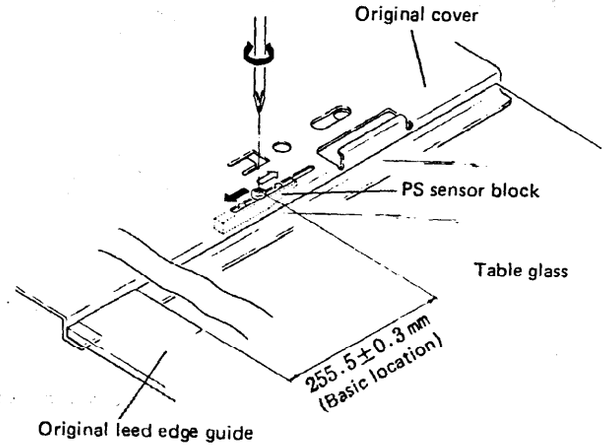
C. Copy lead edge image location

Adjustment is required for the following reason:
- If the copy lead edge image is not within the given limits of –2.5 to –5.5mm.

(Adjustment procedure)

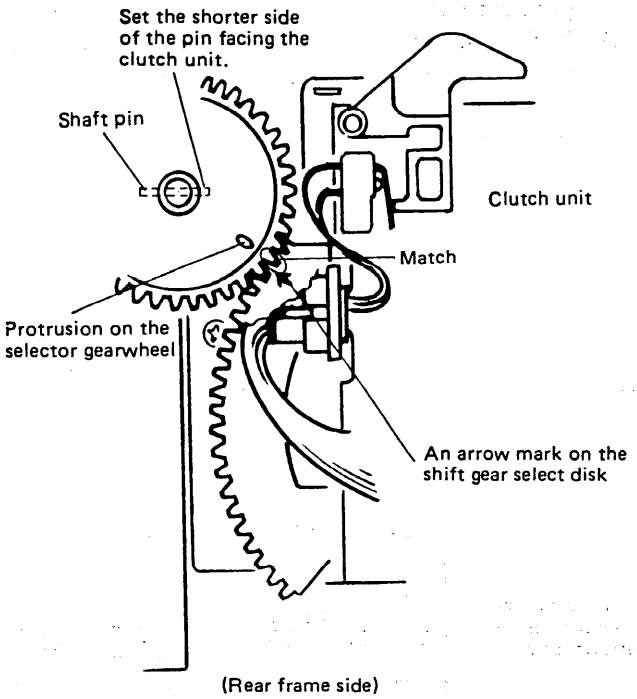
(1) Check the copy lead edge image location.
Place a scale in alignment with the original lead edge guide and make a copy in the normal (x 1.00) mode.
(2) If the image location is more than –5.5mm, move the PS sensor block towards the arrow direction A. If it is less than –2.5mm, move the block in the arrow direction B.


Paper
Basic line of the paper lead edge image (–5.5mm to - 2.5mm)
Within limits
10 20 30 40 50 60
Paper lead edge
If –8mm, move the PS plate sensor block in the arrowhead A.
If +1mm, move the PS plate sensor block in the arrowhead B.

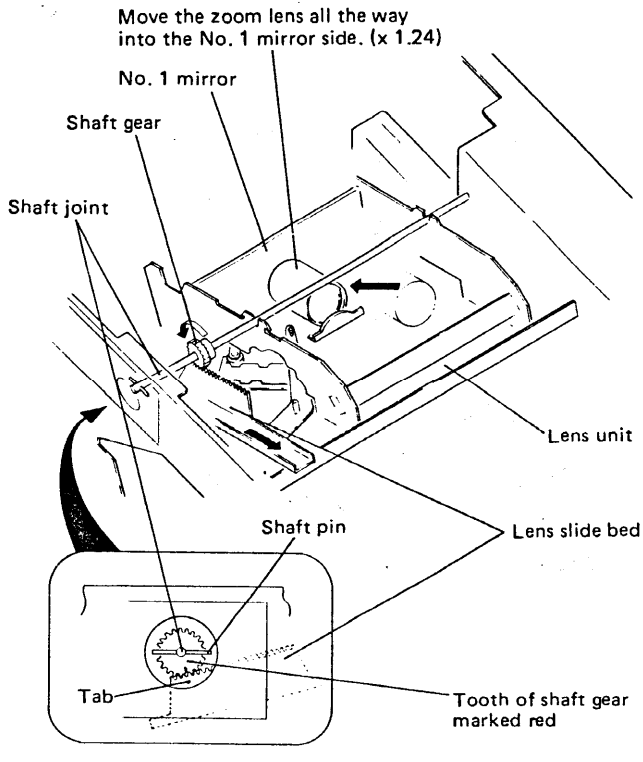


D. Selector gearwheel and shift gear select disk location adjustment.

Set the zoom lens in the enlarge (x 1.24) mode, put the protrusion on the selector gearwheel into engagement with the tooth of the shift gear select disk marked with an arrowhead, with the shorter side of the pin ont the shaft facing the clutch unit while in a horizontal position.


Set the shorter side of the pin facing the clutch unit.
Shaft pin
Clutch unit
Match
Protrusion on the selector gearwheel
An arrow mark on the shift gear select disk
(Rear frame side)

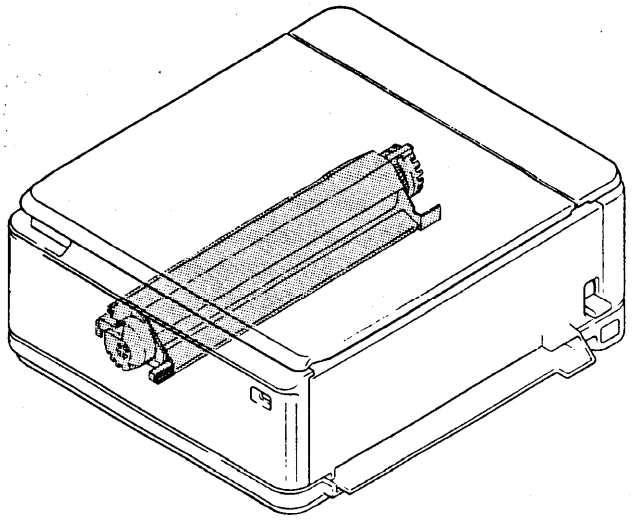
NOTE: The zoom lens and the shaft must be at the enlarge position, when adjustment is being done.


Move the zoom lens all the way into the No. 1 mirror side. (x 1.24)
No. 1 mirror
Shaft gear
Shaft joint
Lens unit
Shaft pin
Lens slide bed
Tab
Tooth of shaft gear marked red

The tooth of the lens slide bed must match with the red marking of the shaft gear and the shaft pin must rest in level.

[9] FUSER SECTION

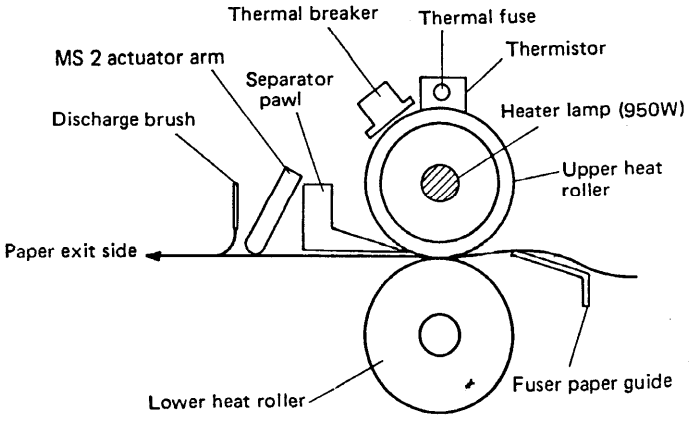
1. General description

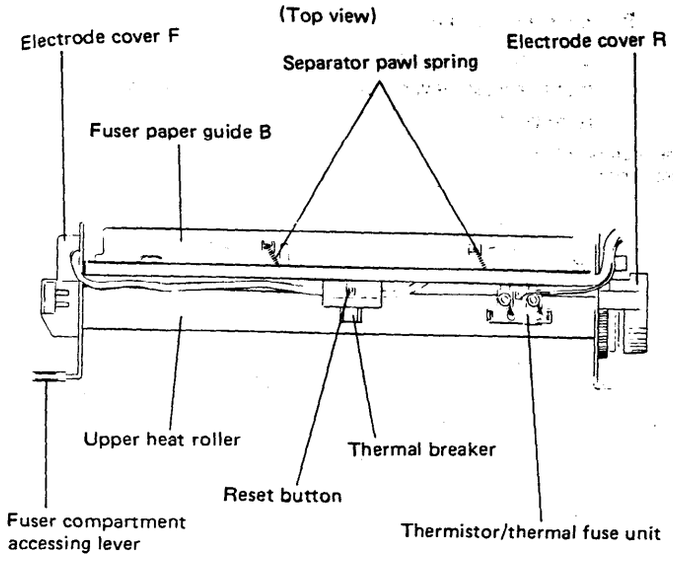


The image is fixed permanently on the copy paper by the action of the fuser. Through a combination of heat and pressure, the image is fused into the copy paper. The Upper Heater Roller contains the heater Lamp, a 950 watt, Halogen Lamp. The temperature of the Heater roller is detected by the Thermistor, which relays this information to the Main PWB. When the temperature is low, the Main PWB energizes the Heater Lamp through a solid state switch called a Triac. The Heater Lamp stays on until the proper temperature is reached.

The heater is protected from overheating by a thermal breaker and a thermal fuse. The thermal breaker is manually resettable. If either the breaker or the fuse opens, voltage to the heater lamp is interrupted, an "H" will appear on the display panel and the copier will stop operation.

General block diagram (cross section)





A. Heat roller

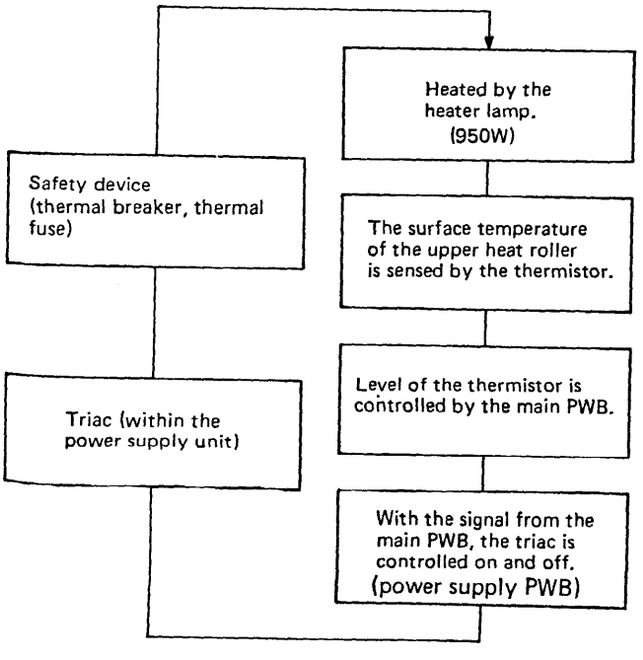
A teflon roller is used for the upper heat roller and a silicone rubber roller is used for the lower heat roller for better toner fusing performance and paper separation.
Simple raising of the fuser compartment accessing lever separates the upper heat roller from the lower heat roller for easier misfed paper removal.

B. Separator pawl

Two separator pawls are used on the upper heat roller. The separator pawl is teflon coated to reduce friction with the roller and prevent a smear on the paper caused by the separator pawl.

C. Thermal control

① The heater lamp, thermistor, main PWB, DC power supply PWB, and triac within the power supply unit are used to control the temperature in the fuser unit.
To prevent irregularly high temperature in the fuser unit, a thermal breaker and thermal fuse are used for safety purposes.


Heated by the heater lamp. (950W)
Safety device (thermal breaker, thermal fuse)
The surface temperature of the upper heat roller is sensed by the thermistor.
Triac (within the power supply unit)
Level of the thermistor is controlled by the main PWB.
With the signal from the main PWB, the triac is controlled on and off. (power supply PWB)

② The surface temperature of the upper heat roller is set to 180°C. The surface temperature during the power save mode is set to 100°C.

③ The self-check function comes active when one of the following malfunctions occurs, and an "H" is displayed on the multicopy window.

a. When the heat roller surface temperature rises above 240°C.
b. When the heat roller surface temperature drops below 100°C during the copy cycle.
c. Open thermistor (*1)
d. Open thermal fuse (*1)
e. Open thermal breaker contacts (*2)

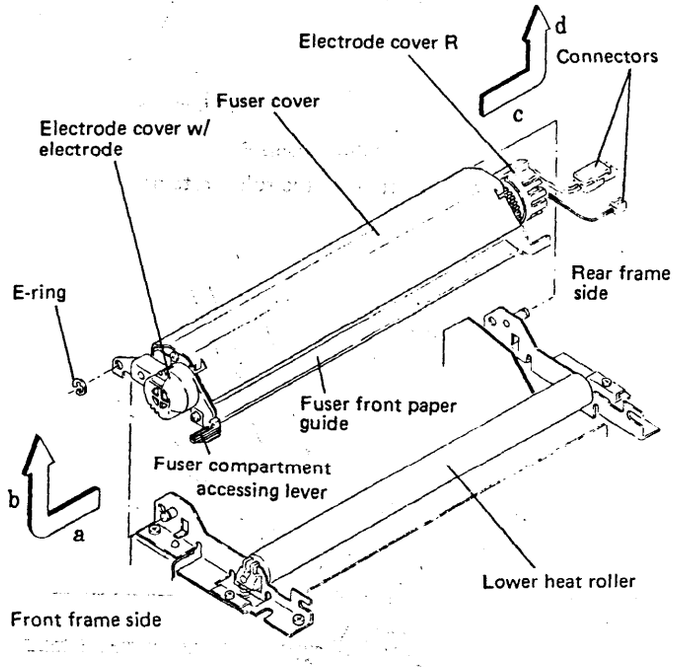
*1. In case of c, d, remove the nuts on the terminal board side and replace the thermistor unit. (See 2. E-④)

*2. When the thermal breaker contacts are open, they have to be reset using the reset button on the thermal breaker. It does not reset automatically.

2. Major component removal

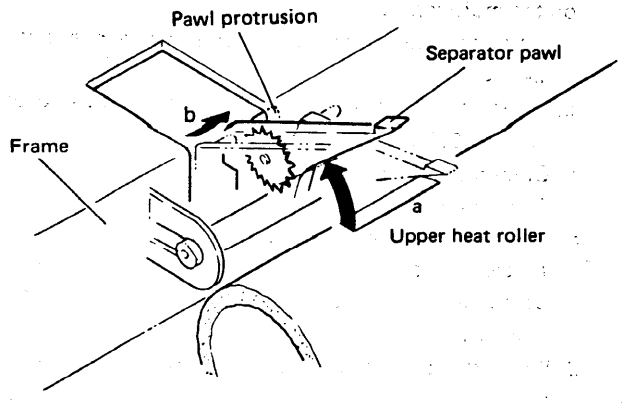
A. Upper heat roller

① Open the upper frame.
② Remove the E-ring and disconnect the two connectors. Remove from boss on the front frame, then the one on the rear frame side(arrow marks a thru d).

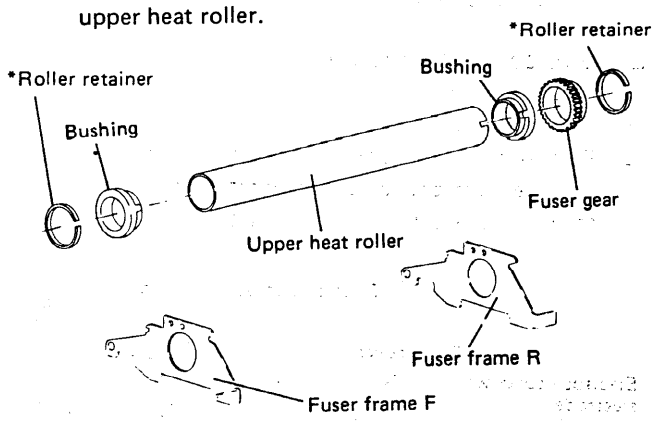


③ Remove the fuser cover, electrode covers F and R, and the heater lamp.

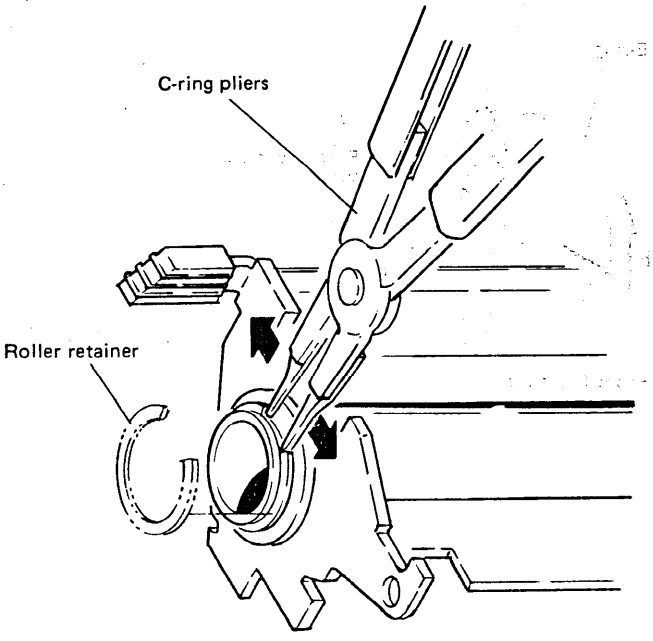
④ To remove the separator pawl from the upper heat roller, hook the protrusion of the separator pawl on the frame, arrow a and b.



⑤ Remove the roller retainer, gear, bushing, and the upper heat roller.

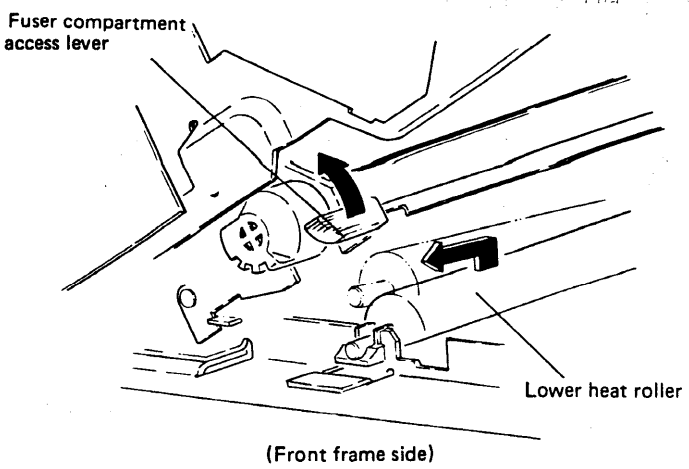


* Use C-ring pliers to remove the roller retainer.



B. Lower heat roller

① Open the upper frame and lift up the fuser compartment access lever. Lift the lower heat roller up to remove it.

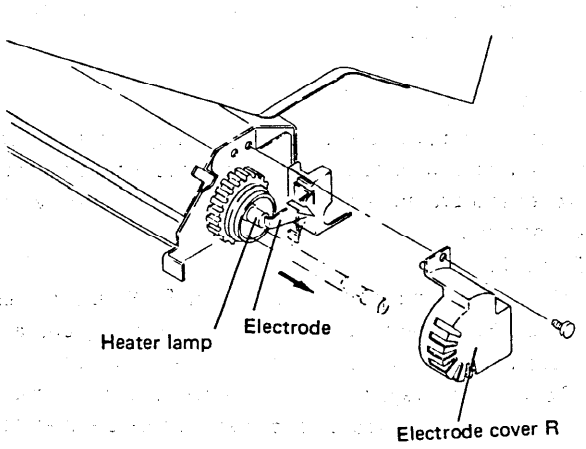


(Front frame side)

C. Heater lamp

① Open the upper frame and remove electrode cover R.

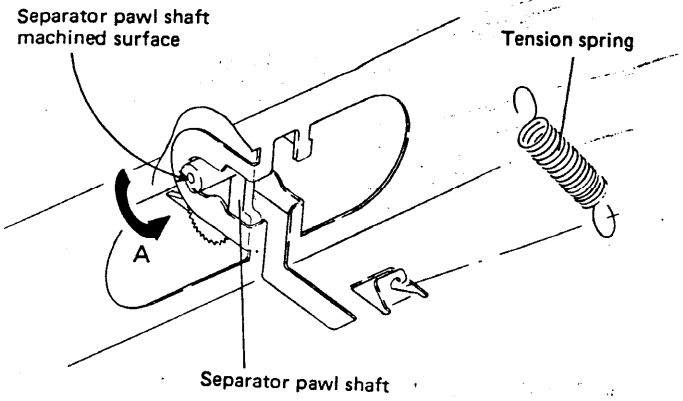
② Remove the heater lamp from the electrode, then carefully slide out the lamp.

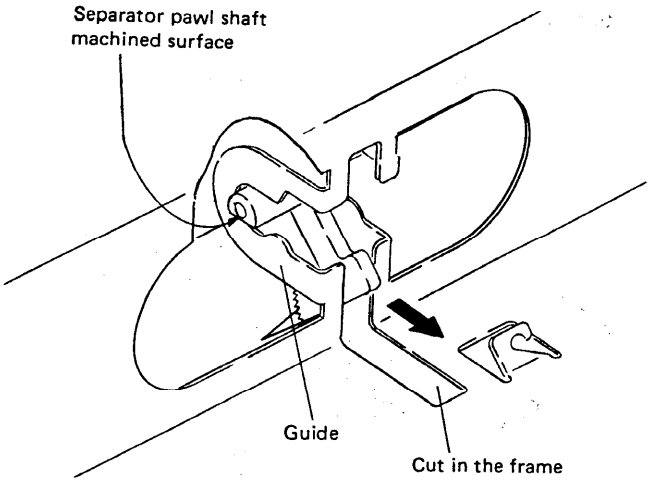


(Rear frame side)

D. Separator pawl

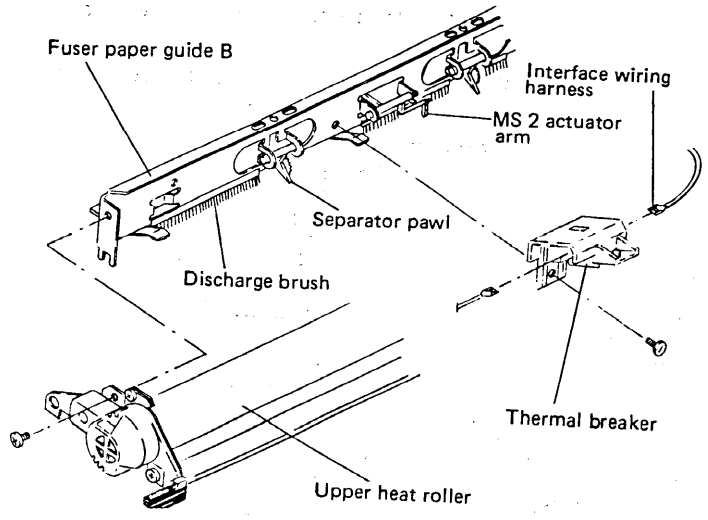
① Remove the upper fuser unit
② Remove the fuser cover.
③ Remove the tension spring. Rotate the pawl in direction A and match the machined surface of the separator pawl shaft to the guide, then remove it from the notch.



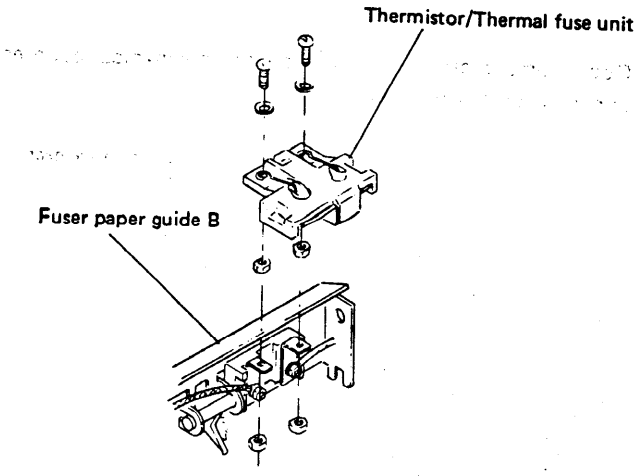


E. Thermal breaker, thermistor (thermal fuse) unit

① Remove the upper fuser unit, and the fuser cover.
② Remove the fuser paper guide B.
③ Remove the screws and HL interface wiring harness then remove the thermal breaker.



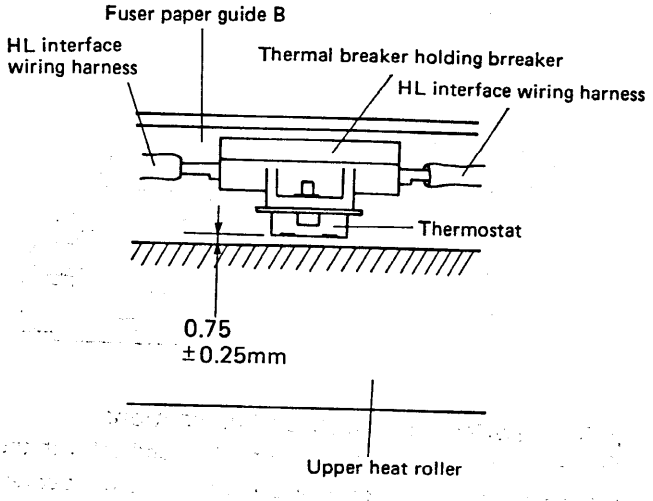
④ Remove the nut on the terminal board side and remove the thermistor/thermal fuse unit.



NOTE: Check items after the installation

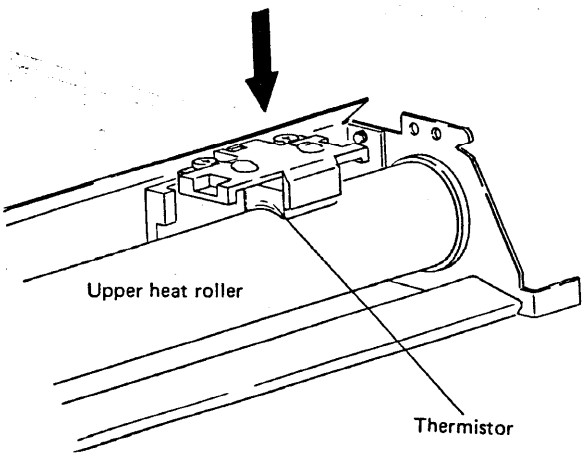
- Thermal breaker

Check to see that the gap between the thermal breaker and the heat roller is 0.75 ±0.25mm.



- Thermistor

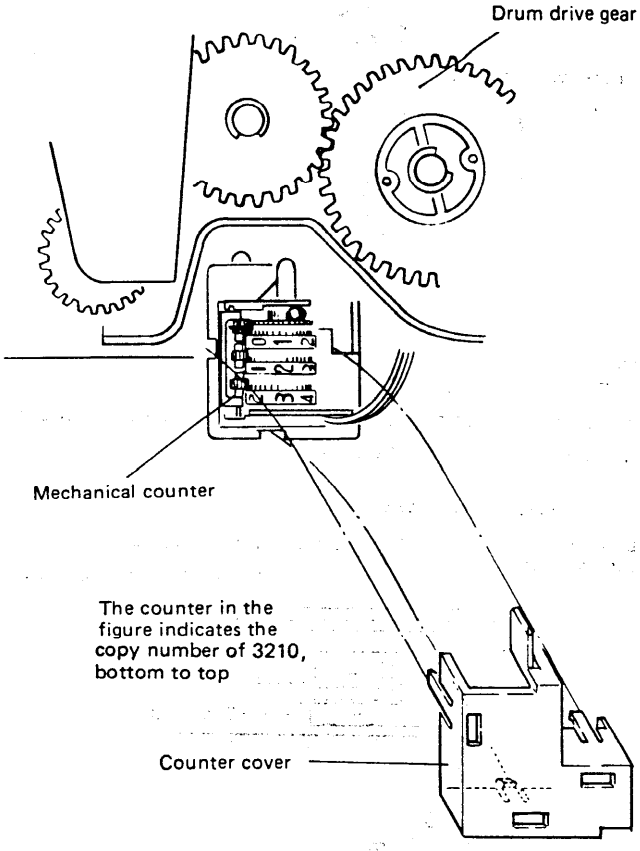
Make sure that the center of the thermistor is in contact with the heat roller.



[10] OTHERS

1. Drum counter

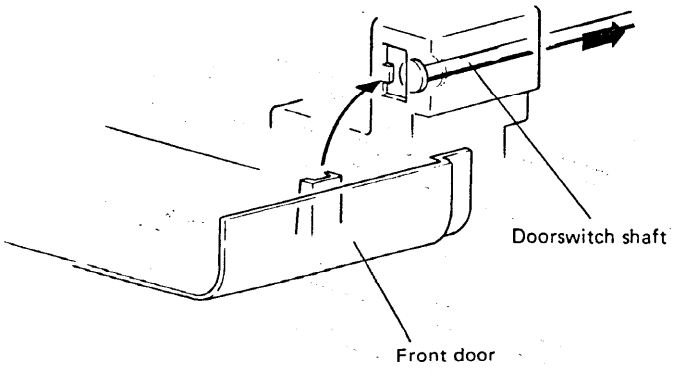
Copy number can be checked on the mechanical counter under the drum drive gear.


Drum drive gear
Mechanical counter
The counter in the figure indicates the copy number of 3210, bottom to top
Counter cover

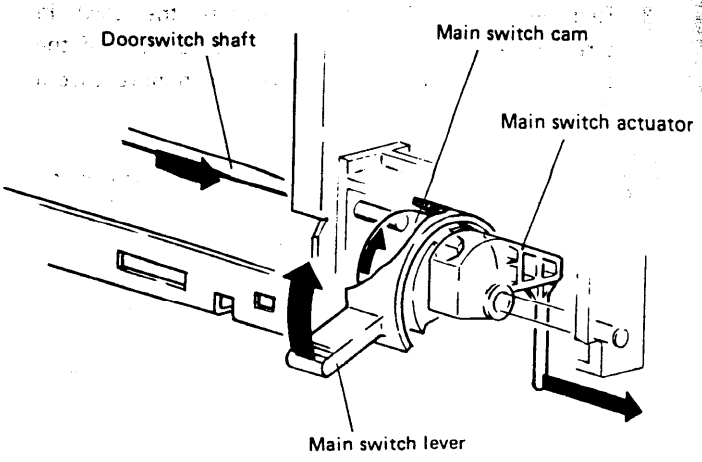
2. Main switch mechanism and precautions

The main power supply can be turned on and off with the POWER switch lever or opening and closing the front cover.

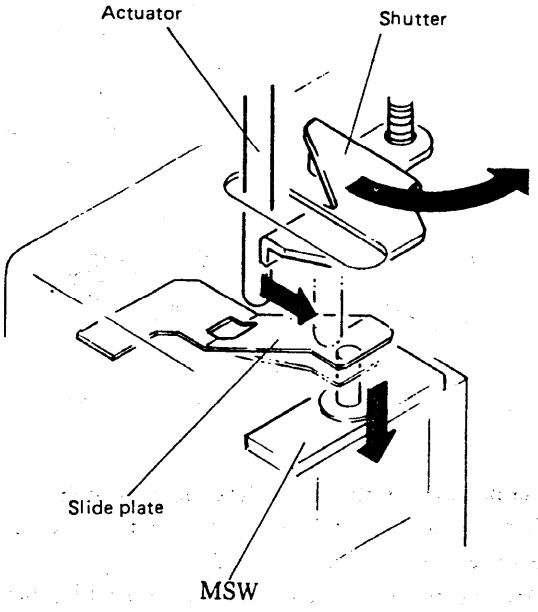
- When the front door is closed, the doorswitch shaft is pushed by the protrusion on the front door which actuates the actuator.



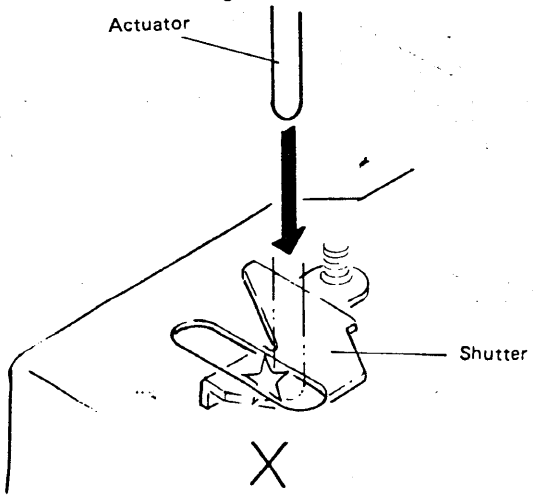
- When the main switch lever is pushed up, the raising part of the cam rides over the actuator. When the front door is closed, the actuator slides towards the rear frame side.



- The slide plate presses down the main switch protrusion to turn power on.

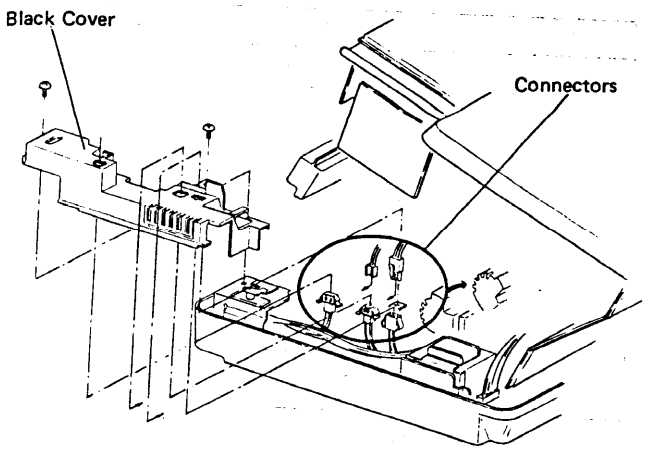


CAUTION: Care must be taken not to close the front door with the doorswitch hole closed with a door "cheat" as it may damage the main switch shutter. The "cheat" has to be removed before closing the front door.

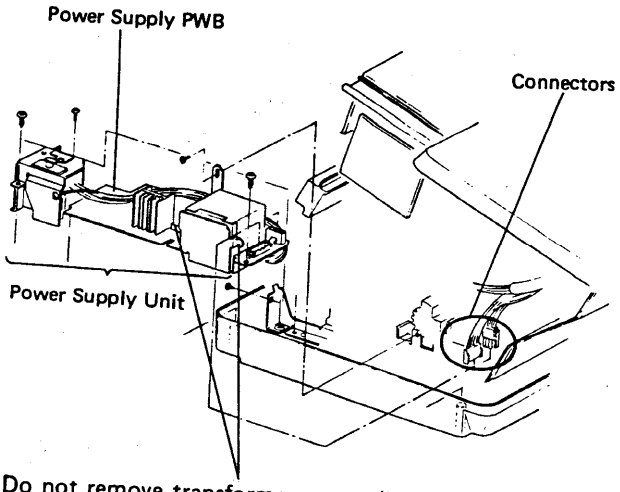


3. Removal of the Power Supply Unit

① Open the frames and remove the rear cover.
② Remove the 2 fixing screws on the black cover and disconnect the connectors. Then, remove the black cover.



③ Remove the 5 fixing screws on the power supply unit and disconnect the 2 connectors shown in the figure. Then, lift the power supply unit out of the main body.

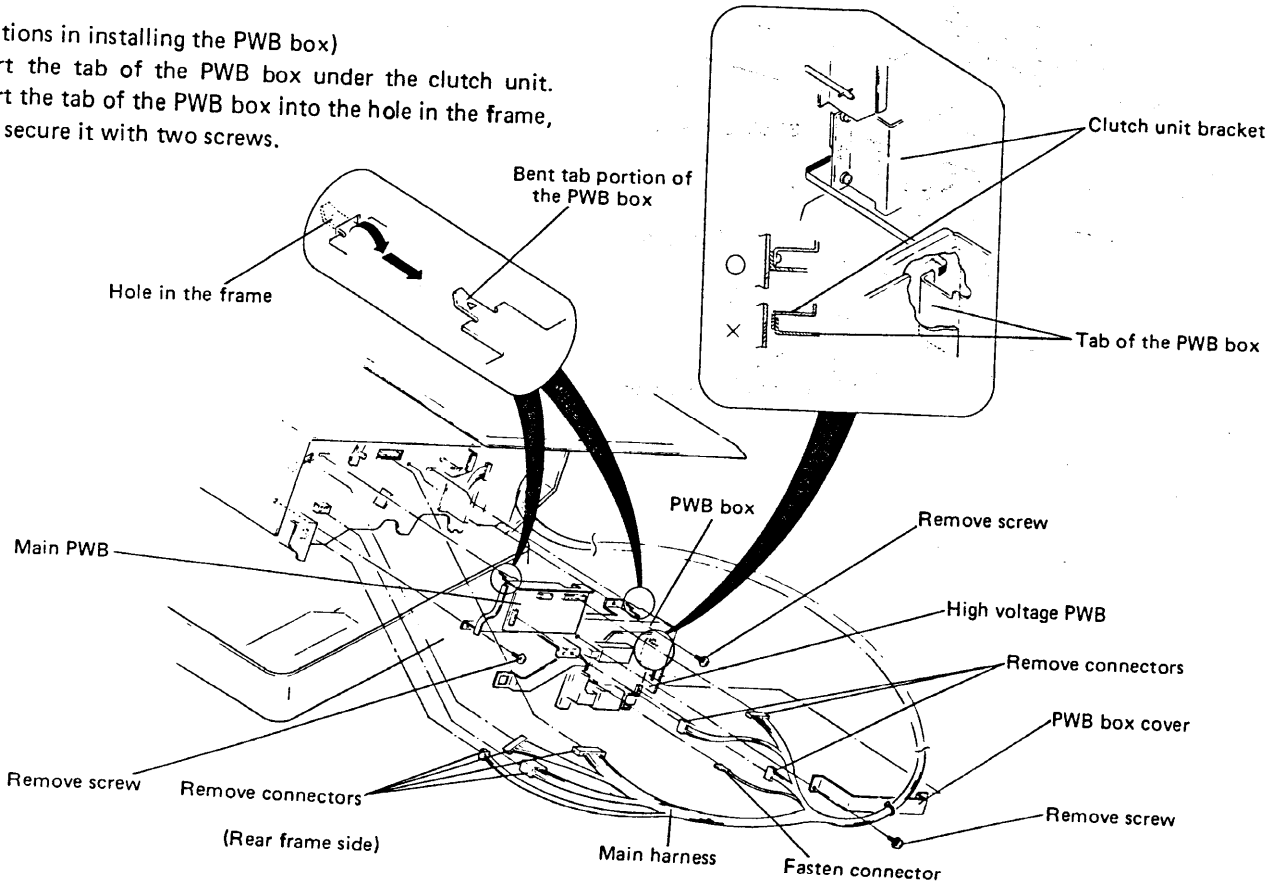


Do not remove transformer screws (Red, 2) when removing Power Supply unit. It may damage the PWB as stress is added to the PWB.
The transformer is directly soldered to the PWB.

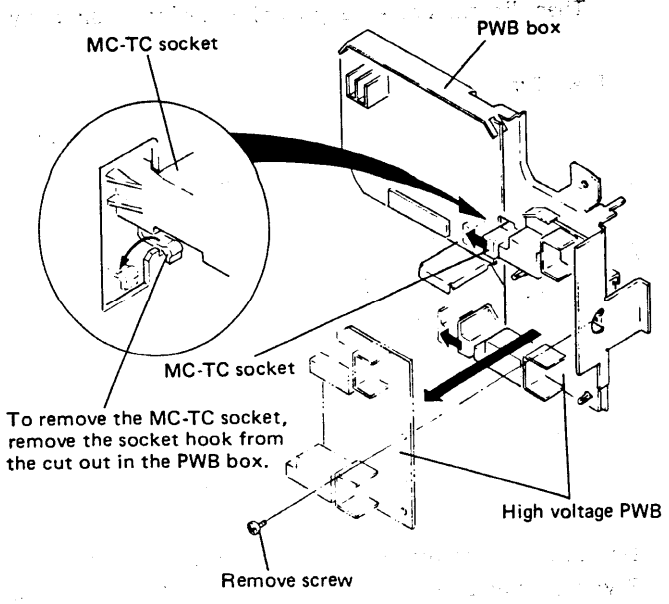
4. High voltage unit replacement

① Remove the rear cover.
② Unfasten the main harness connectors at seven locations and the high voltage PWB faaten connector.
③ Remove the PWB box cover.
④ Remove screws at two locations, then remove the PWB box.

(Precautions in installing the PWB box)
- Insert the tab of the PWB box under the clutch unit.
- Insert the tab of the PWB box into the hole in the frame, then secure it with two screws.

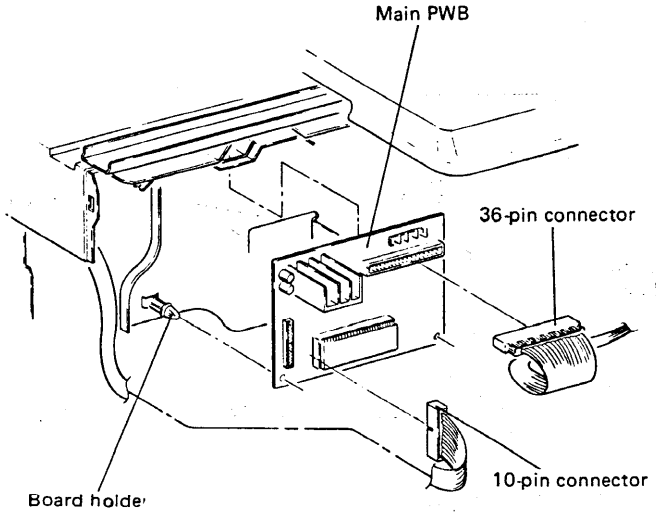


⑤ Unfasten the MC-TC sockets from the PWB box and replace the high voltage PWB.


MC-TC socket
PWB box
MC-TC socket
To remove the MC-TC socket, remove the socket hook from the cut out in the PWB box.
High voltage PWB
Remove screw

5. Main PWB replacement

① Remove the rear cover.
② Unfasten the 36-pin and 10-pin connectors from the main PWB.
③ Grasp the board holder locks at two locations with long nose pliers and release the main PWB from the lock.



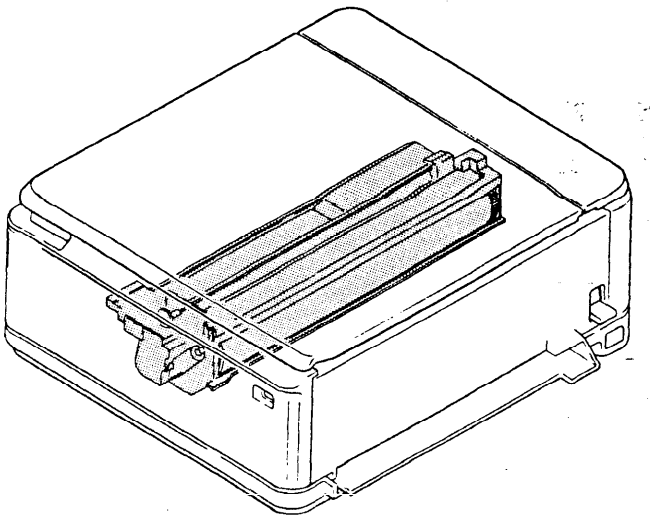
(Rear frame side)

6. Self-diagnostic function

The machine stops immediately if the copier goes into the self-diagnostic mode, and an alphabetic status fleshes on the copy number display window.

Status	Phenomenon	Command clear
H	Trouble in the heater system. a) Open fuser block thermistor, thermal fuse or breaker b) Detection of a high temperature (240°C) in the fuser block c) Detection of a low temperature (100°C) in the fuser block d) Detection of fuser block irregular temperature level (180°C)	Turn power switch off.
L	Trouble in the original table drive system Malfunction of the table position sense switch (MS4, MS5) or a failure in the table drive unit.	Turn power switch off.
P	Alert for the paper feed block trouble a) Cassette paper empty b) Paper misfeed in the paper feed block	Press any one of operation keys (CLEAR, READY) or activate the manual feed paper detect switch with copy paper.
E	Alert for the magnification select dial position If the magnification ratio was not set properly after manipulation of the dial or at power on.	Set the dial to the appropriate position.

7. Drum cartridge



General Description:
The drum cartridge consists of an OPC drum, main corona, remover tape, cleaning blade and auger rollor. A small tab on the rear frame side of the cartridge is used for resetting the mechanical drum counter. This is a one-time only action and will not reset the counter again if the drum cartridge were to be removed and reinserted.

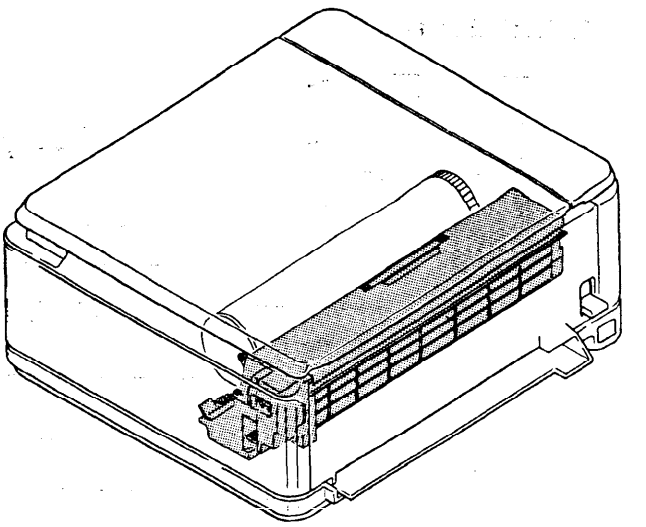
Moving the main corona wire cleaner lever our and in cleans the main corona wire.

Inside the drum cartridge the cleaner blade is in constant contact with the drum. During the copy process the residual image is removed from the drum surface by the blade. The auger roller transports the used toner to the toner collection container located on the front of the TD cartridge.

The remover tape located on the rear frame side of the drum cartridge mechanically strips the paper from the drum and guides it to the separation roller. Due to the copy paper not contacting the drum in this area there is a void of less than 9 mm along the rear frame side of the copy.

NOTE: The drum cartridge is set to factory specifications and is not adjustable in the field. If a problem is suspected replace the entire cartridge.

8. TD cartridge

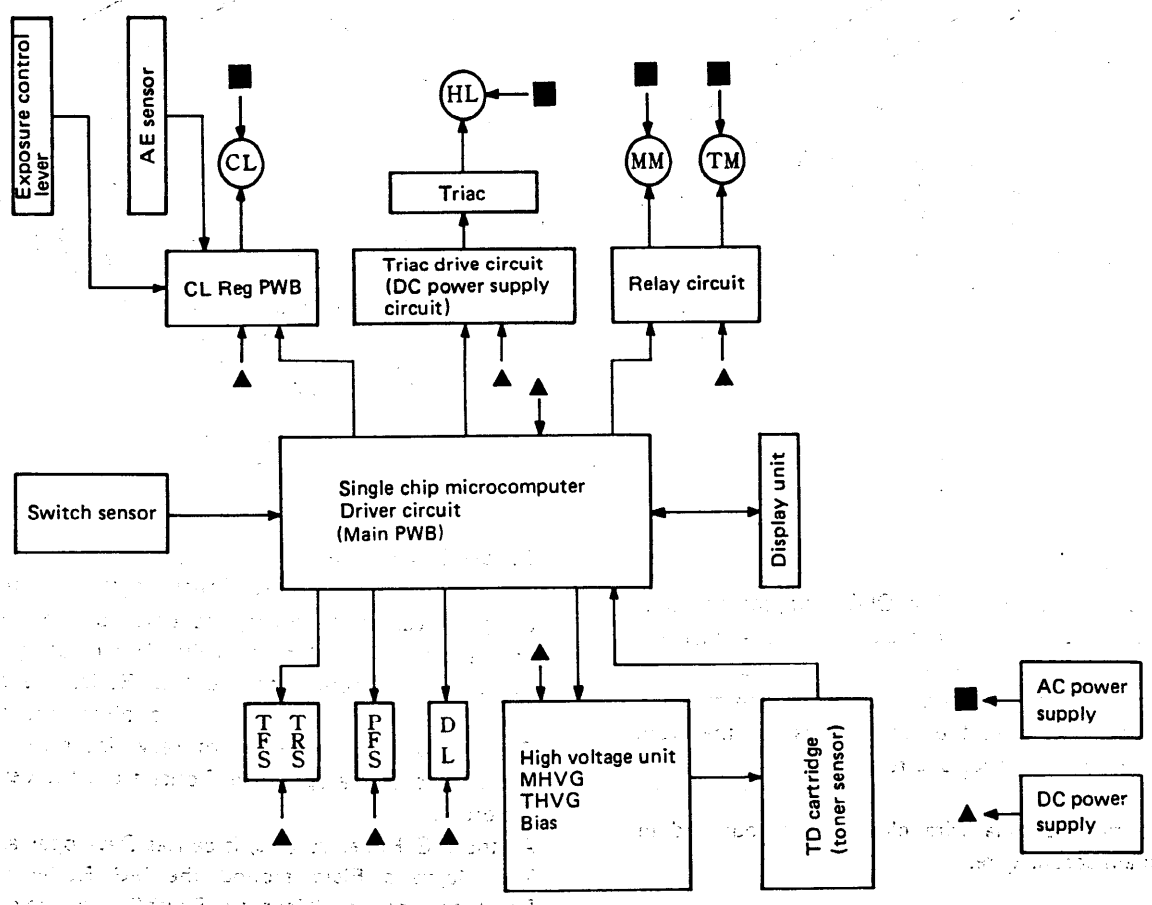


General Description:
The TD cartridge applies Toner to the electrostatically charged areas of the drum, and develops the latent image on the drum. The Magnetic roller is a rotating aluminum sleeve. At the center of the MG Roller are stationary magnets. These magnets hold and direct the developer. The developer is composed of very fine magnetic filings and is used to transport the Toner from the developer to the drum.
As the MG Roller rotates, it carries Developer and Toner. The Magnetic Field around the MG Roller forms the Developer into a "Magnetic Brush". The height of the Magnetic Brush is determined by the Doctor Blade. The angle of the brush is determined by the position of the magnets in the MG Roller.
The Auger Roller keeps the mixture of Toner and Developer agitated and uniformly mixed. Since the Developer is used as a carrier of Toner, the Developer is not used up, and the volume of Developer remains constant. As the Toner is pulled out of the Developer, the ratio of toner to developer decreases. The Toner Sensor measures this ratio, and relays this information to the Main PWB which will energize the Toner Motor (TM) when additional Toner is required. The Toner Motor is mounted on the rear frame of the copier.
The Toner Sensor and Bias connect to the Main PWB by a four pin connector located on the rear side of the Unit.
The Bias voltage is used to prevent background by applying a counter balancing charge to the Developer.

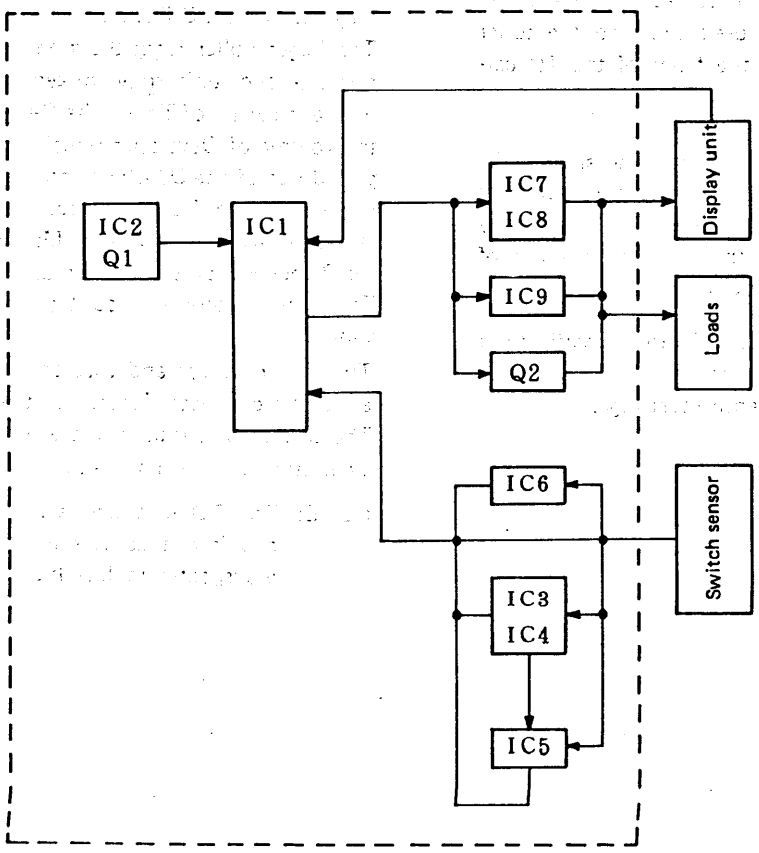
NOTE: The TD cartridge is set to factory specifications and is not adjustable in the field. If a problem is suspected replace the entire cartridge.

[11] ELECTRICAL SECTION

1. Block diagram



2. Main PWB block diagram



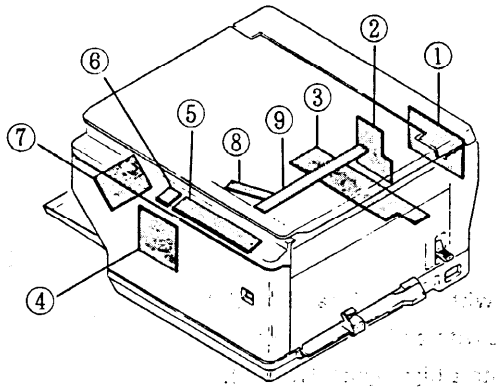
3. IC1 (single chip microprocessor) signal description

Pin No.	In/Out	Signal name	Function
1			Pull down resistor
2	Out	S0	Switch sensing strobe
3	Out	S1	Switch sensing strobe
4	–	–	Switch sensing strobe
5	Out	PFS	Paper feed solenoid control, solenoid active with a high signal (H: +5V).
6	In	I4	Switch input
7	In	I5	Switch input
8	In	HT	Heater trouble detect signal, active low (0V).
9	In	KI	Operation panel input, key on with a high signal (H: +5V).
10	Out	MDL1	Display digit select
11	Out	MDL2	Display digit select
12	Out	TFS	Table feed solenoid control, solenoid active with a high signal (H: +5V).
13	Out	TRS	Table return solenoid control, solenoid active with a high signal (H: +5V).
14	Out	MHV	Main corona control, active with a high signal (H: +5V).
15	Out	THV	Transfer corona control, active with a high signal (H: +5V).
16	Out	CLR	Copy lamp control, lamp active with a high signal (H: +5V).
17	Out	HL	Heater lamp control, lamp active with a high signal (H: +5V).
18	In	RESET	Reset active with a high signal (H: +5V).
19	–	–	Clock pulse
20	–	V_{DD}	+5V supply
21	–	–	Clock pulse
22	–	–	GND (0V)
23	In	I0	Switch input
24	In	I1	Switch input
25	In	I2	Switch input
26	In	I3	Switch input
27	Out	MMR	Main motor relay control, relay active with a high signal (H: +5V).
28	Out	TMR	Toner motor relay control, relay active with a high signal (H: +5V).
29	Out	DL	Discharge lamp control, lamp active with a high signal (H: +5V).
30	Out	TC	Not used
31	Out	E	Display segment signal
32	Out	F	Display segment signal
33	Out	G	Display segment signal
34	–	–	
35	Out	A	Display segment signal
36	Out	B	Display segment signal
37	Out	C	Display segment signal
38	Out	D	Display segment signal
39	–	V_{SS}	GND (0V)
40	–	–	GND (0V)

[12] Circuit diagram and Time chart

AC POWER SUPPLY CIRCUIT 44
RELAY CIRCUIT 45
RELAY P.W.B. 45
DC POWER SUPPLY CIRCUIT 46
POWER SUPPLY P.W.B. 46
MAIN CIRCUIT 47
MAIN P.W.B. 48
CLR CIRCUIT 49
CLR P.W.B. 49
CLR HI201 (IC) INTERNAL CIRCUIT 50
OPERATION CIRCUIT – A, B 51
OPERATION P.W.B. A, B 51
TIME CHART 1 PRELIMINARY OPERATION 52
TIME CHART 2 A4 (8½ x 11") SIZE MULTI COPY (x 1.0) 53
TIME CHART 3 A4 (8½ x 11") SIZE MULTI COPY (x 0.7) 54
TIME CHART 4 A4 (8½ x 11") SIZE MULTI COPY (x 0.8) 55
TIME CHART 5 A4 (8½ x 11") SIZE MULTI COPY (x 1.24) 56
TIME CHART 6 MANUAL FEED COPY 57

PWB location



①	Main PWB
②	High voltage PWB
③	Power supply PWB
④	CLR PWB
⑤	Operation PWB-A
⑥	Operation PWB-B
⑦	Relay PWB
⑧	Lens location sensor switch PWB
⑨	Blank lamp PWB

① Main PWB
a. Controls the timing of the Z-50 copiers electrical circuits.

② High voltage PWB
a. Supplies high voltage to the main and transfer coronas, and developing bias, ON and OFF timing is controlled by signals from the main PWB.

③ Power supply PWB
a. Supplies voltages for the motors, lamps, solenoids, transformers and PWB's.

④ Copy lamp regulator PWB
a. Turns the copy lamp ON and OFF via signals from the main PWB.
b. Automatically controls the copy lamp intensity via signals received from the photo sensor in the optical unit.

⑤ Operation PWB-A
a. Key control and display signals via the main PWB.

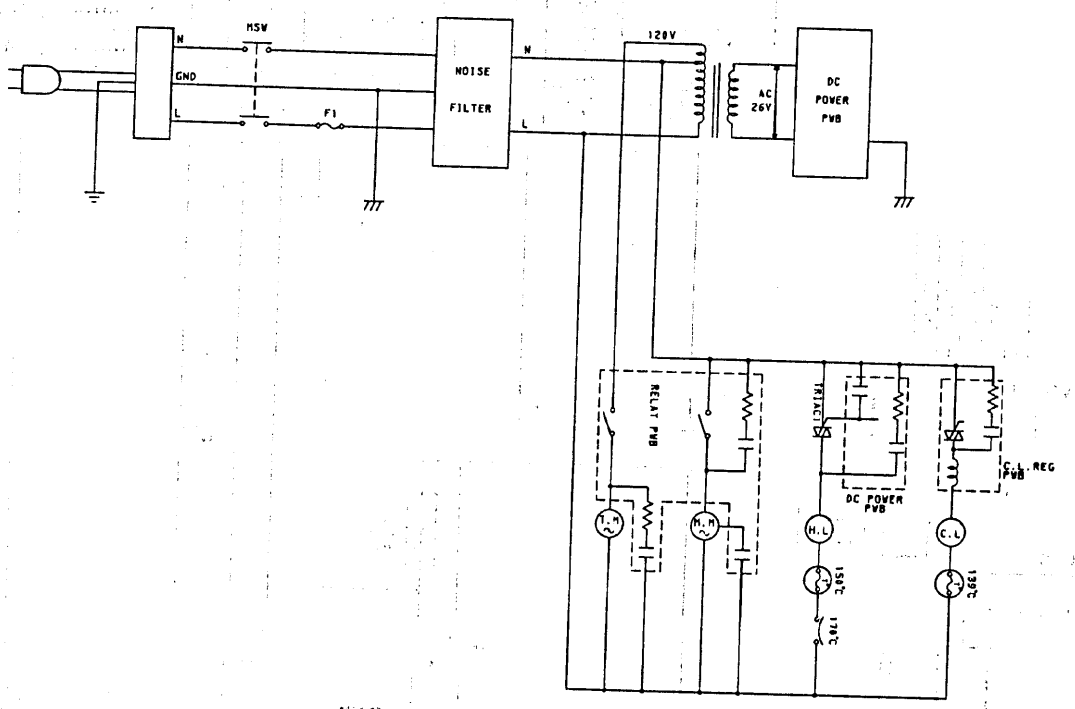
⑥ Operation PWB-B
a. Exposure selection signals to the copy lamp regulator PWB.

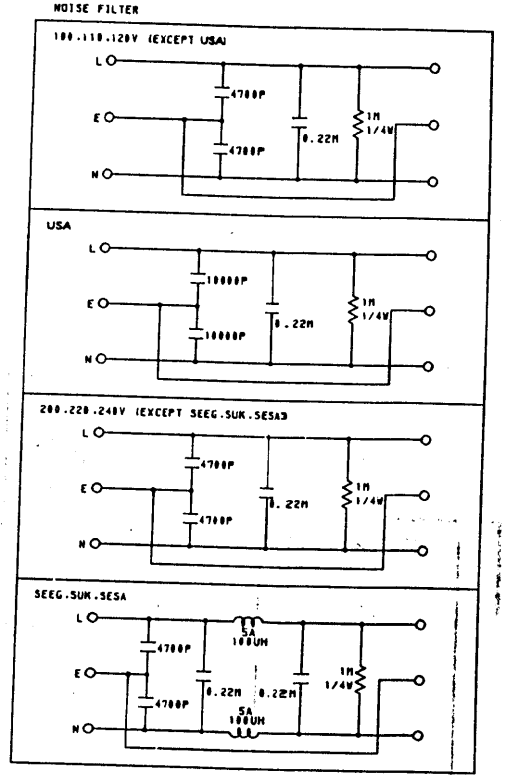
⑦ Relay PWB
a. Controls the power for the main motor and toner motor through relays ON OFF time determined by signals received from the main PWB.

⑧ Lens location sensor switch PWB
a. Used to find the lens location in the magnification copy mode, to send signal to the main PWB.

⑨ Blank lamp PWB
a. Light from the side lamp is exposed to the out of image area on the drum to prevent toner from being applied to the out of image area.
b. Light from the void lamp is cast over the remover tape contact area on the drum to prevent toner from being applied to the void area.

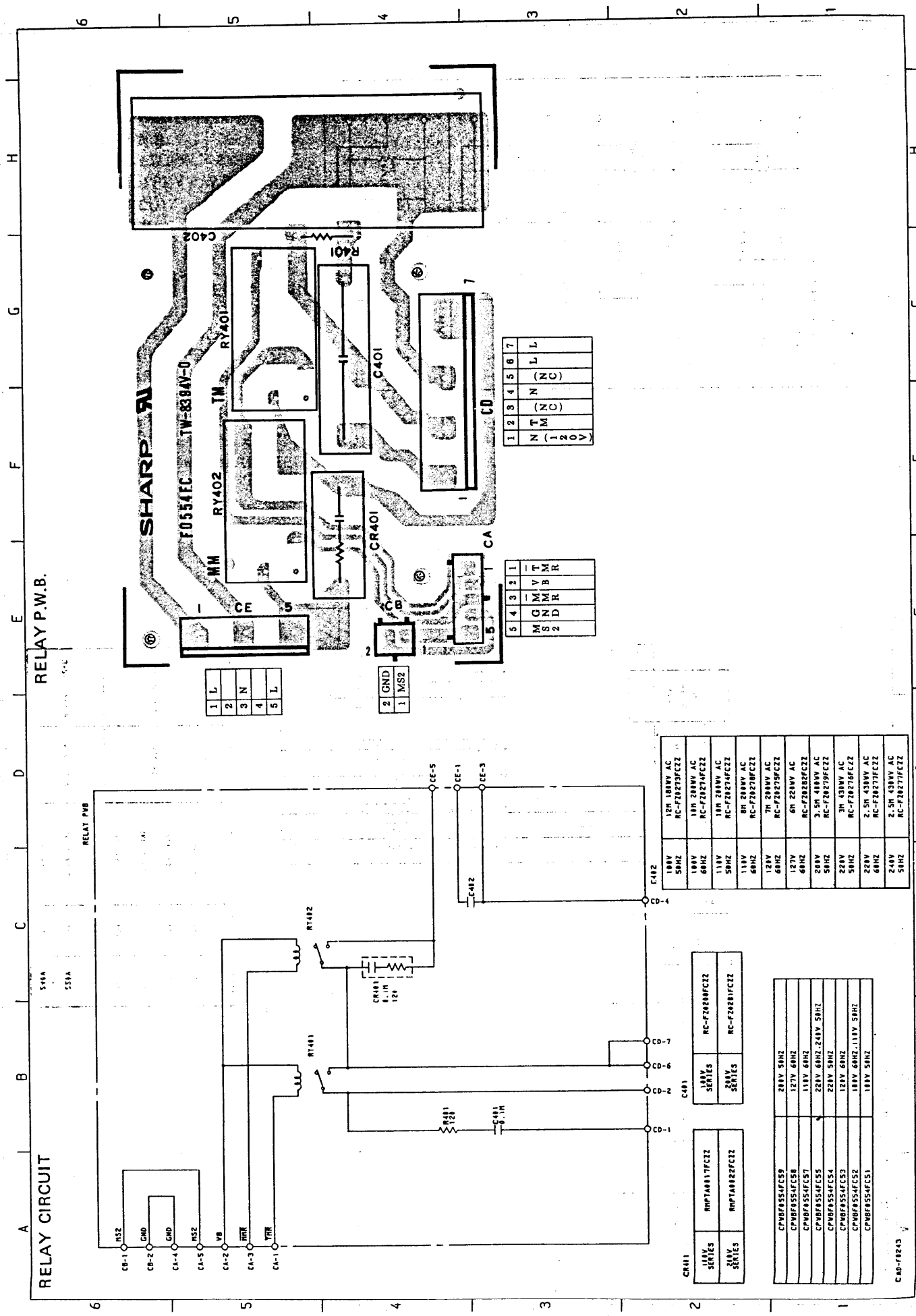
AC POWER SUPPLY CIRCUIT

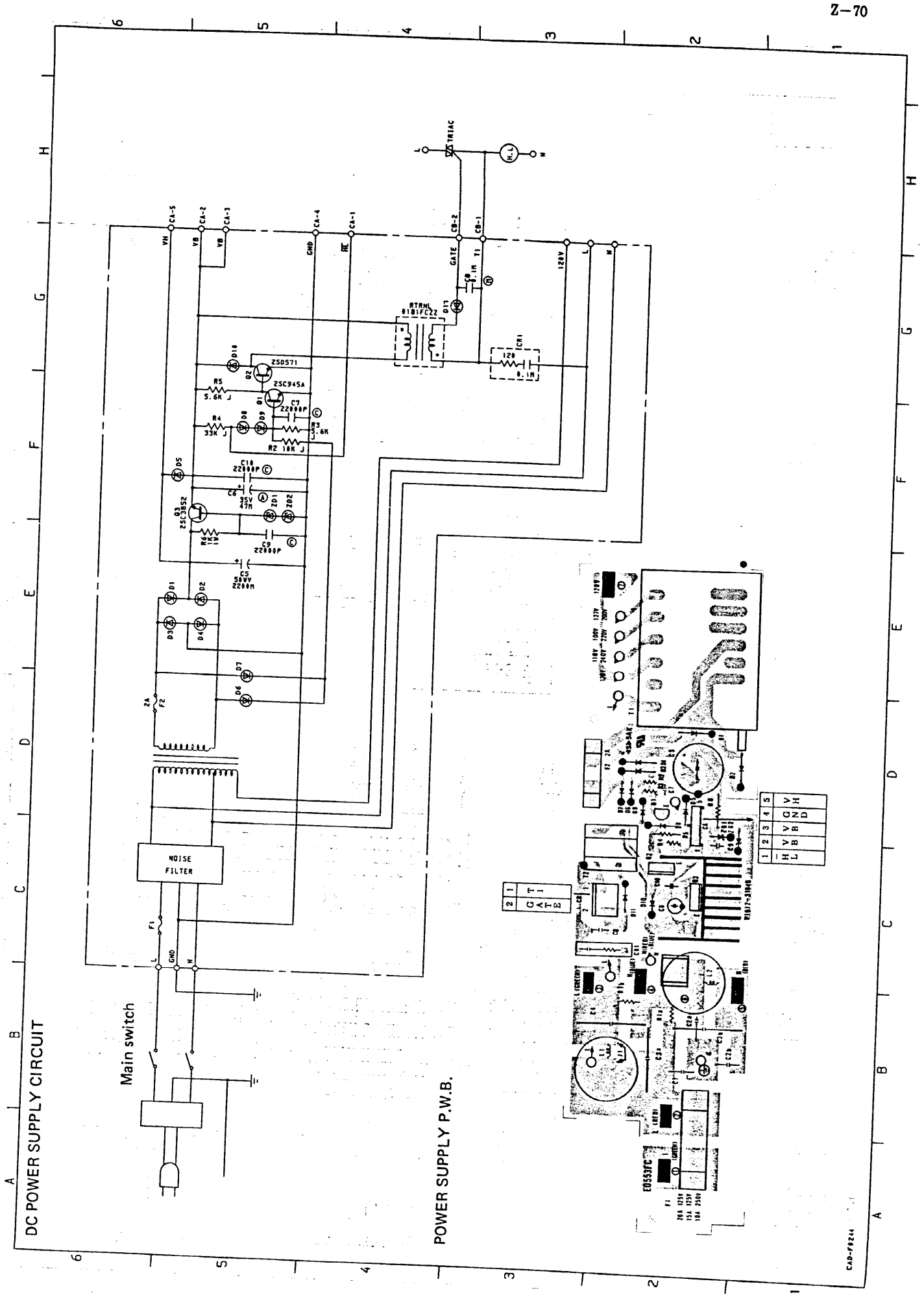


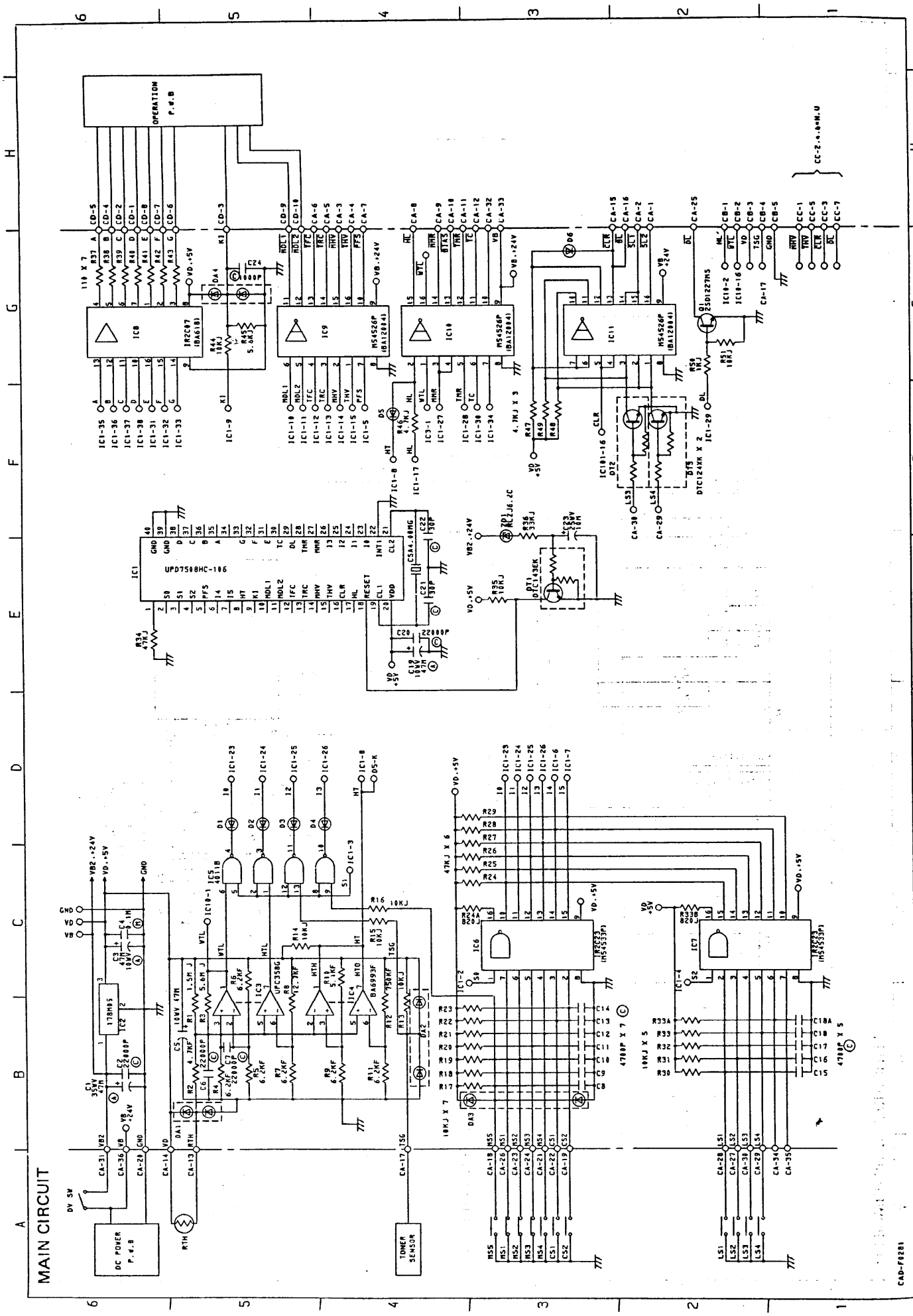


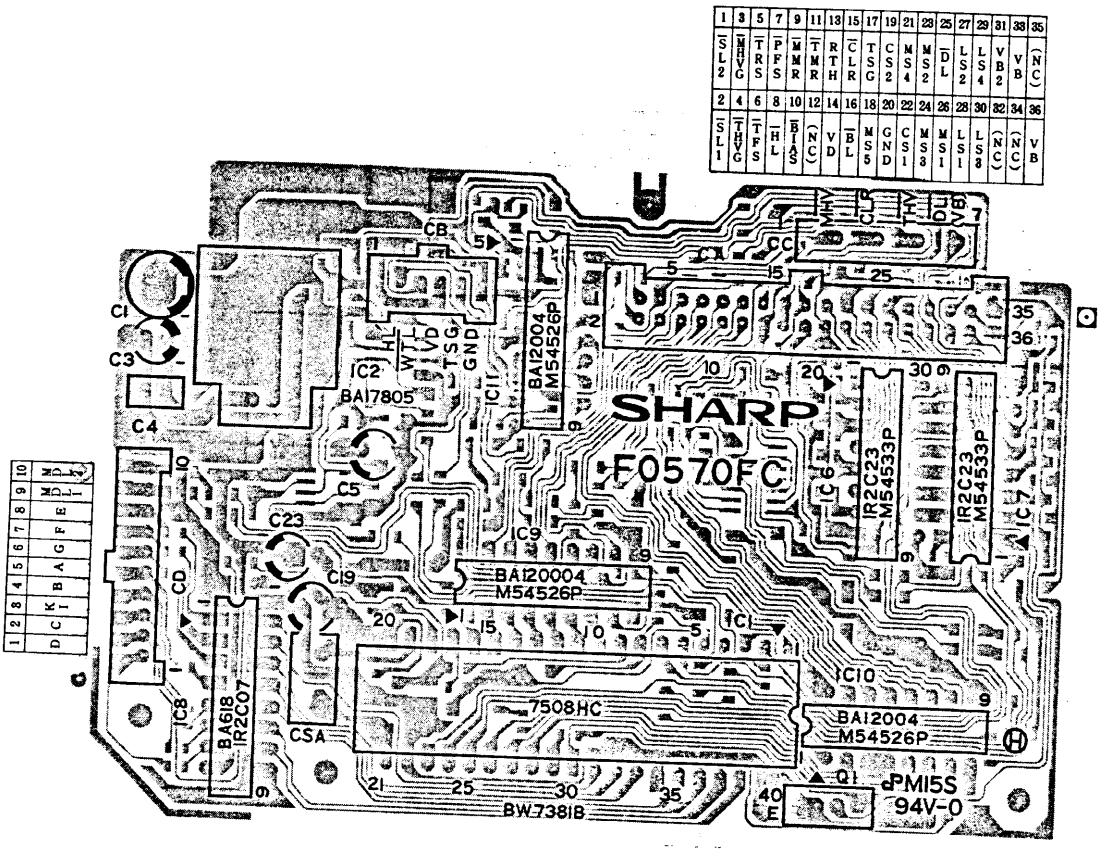
	F1	H.L	C.L	TRIAC1
100V	20A	950W (100V)	285−80V	BCR16HM-8-C
110V	20A	950W (110V)		
120V	15A	950W (120V)		
127V	15A	950W (127V)		
200V	10A	950W (200V)	285−160V	BCR16HM-12-C
220V	10A	950W (220V)		
240V	10A	950W (240V)		

CAD-F0245

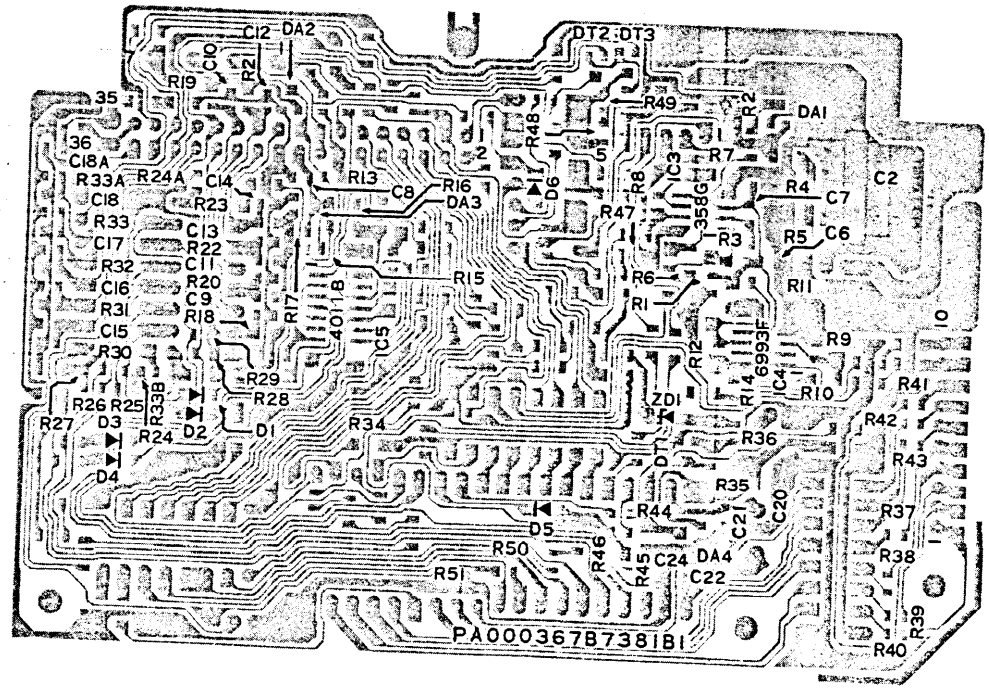

RELAY P.W.B.
RELAY CIRCUIT
SHARP
TW-838AV-0
RY401
RY402
C401
C402
R401
CR401
CA
CB
CC
CD
CE
1 L
2
3 N
4
5 L
2 GND
1 MS2
5 MGSND
4 MVDC
3 MVDC
2 TMR
1 TMR
1 2 3 4 5 6 7
NTM (120V)
N (NC)
L
L
RELAY PWB
CB-1 MS2
CB-2 GND
CA-4 GND
CA-5 MS2
CA-2 VB
CA-3 MTR
CA-1 TMR
CE-5
CE-1
CE-3
CD-4
CD-7
CD-6
CD-2
CD-1
RY402
RY401
CR401 8.1M 12J
R401 12J
C401 0.1M
C402
CR401
100V SERIES RMPTA0017FCZZ
200V SERIES RMPTA0022FCZZ
C401
100V SERIES RC-FZ0200FCZZ
200V SERIES RC-FZ0201FCZZ
C402
100V 50HZ 12M 100VV AC RC-FZ0239FCZZ
100V 60HZ 10M 200VV AC RC-FZ0274FCZZ
110V 50HZ 10M 200VV AC RC-FZ0274FCZZ
110V 60HZ 8M 200VV AC RC-FZ0208FCZZ
120V 60HZ 7M 200VV AC RC-FZ0275FCZZ
127V 60HZ 6M 220VV AC RC-FZ0282FCZZ
200V 50HZ 3.5M 400VV AC RC-FZ0279FCZZ
220V 50HZ 3M 430VV AC RC-FZ0276FCZZ
220V 60HZ 2.5M 430VV AC RC-FZ0277FCZZ
240V 50HZ 2.5M 430VV AC RC-FZ0277FCZZ
CPWBF5S54FCS9 200V 50HZ
CPWBF5S54FCS8 127V 60HZ
CPWBF5S54FCS7 110V 60HZ
CPWBF5S54FCS5 220V 60HZ,240V 50HZ
CPWBF5S54FCS4 220V 50HZ
CPWBF5S54FCS3 120V 60HZ
CPWBF5S54FCS2 100V 60HZ,110V 50HZ
CPWBF5S54FCS1 100V 50HZ
CAD-FB243


DC POWER SUPPLY CIRCUIT
POWER SUPPLY P.W.B.
Main switch
NOISE FILTER
TRIAC
2SD571
2SC945A
RTRML 0101FC22
CR1
120
0.1M
33K J
5.6K J
10K J
22000P
35V 47M
50V 2200M
2A F2
F1
GND
VH
VB
GATE
120V
L
N
CA-5
CA-2
CA-3
CA-4
CA-1
CB-2
CB-1
T1
Q1
Q2
Q3
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
ZD1
ZD2
R1
R2
R3
R4
R5
R6
C5
C6
C7
C8
C9
C10
GATE
H V VG V
L B BN H
EO553FC


MAIN CIRCUIT
OPERATION P.W.B
DC POWER P.W.B
TONER SENSOR
UPD7508HC-106
CAD-F0281

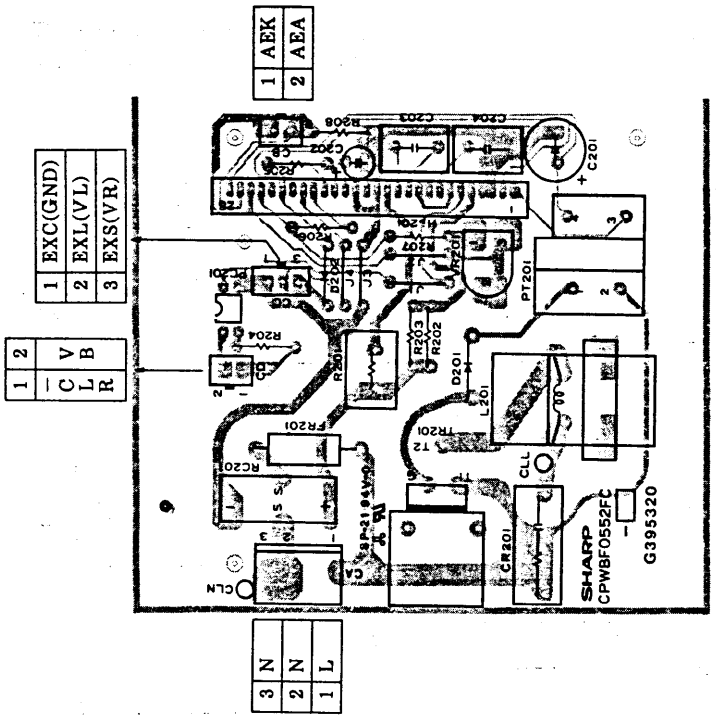


TOP VIEW

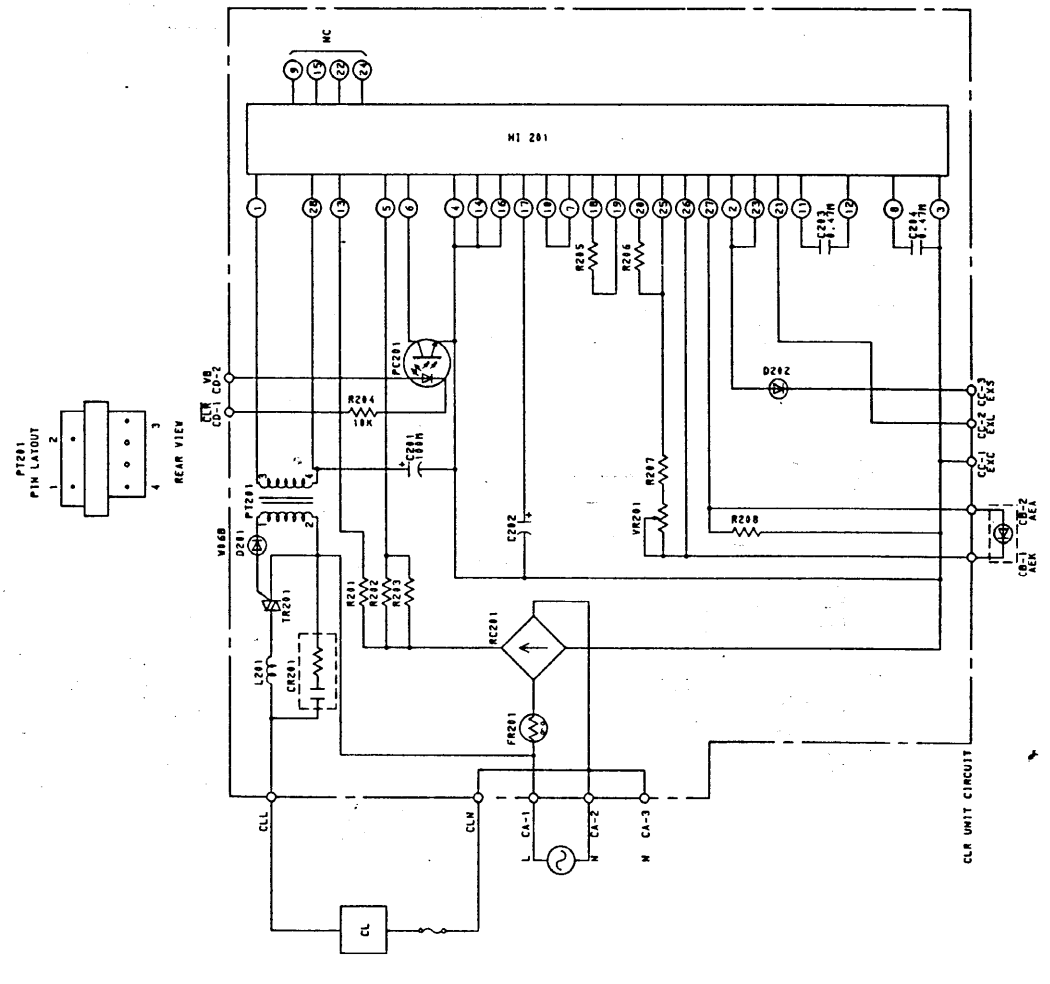


BOTTOM VIEW

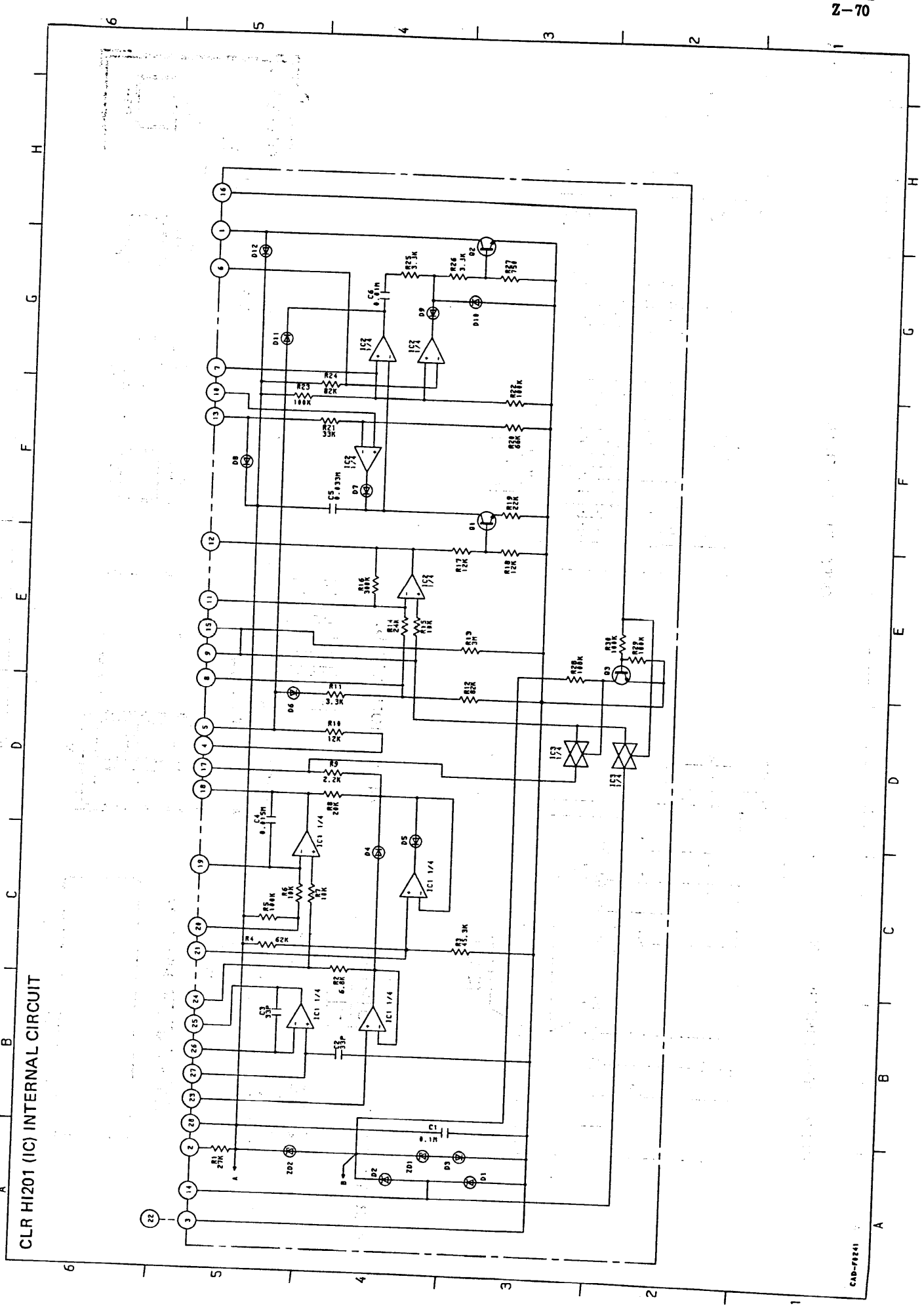
CLR P.W.B.



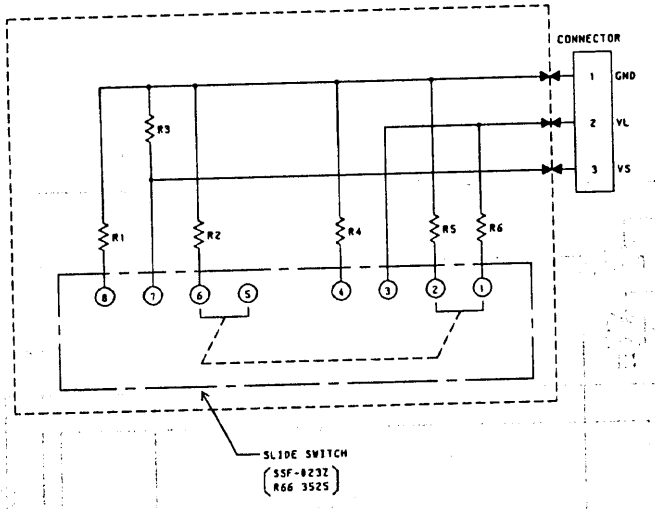
CLR CIRCUIT



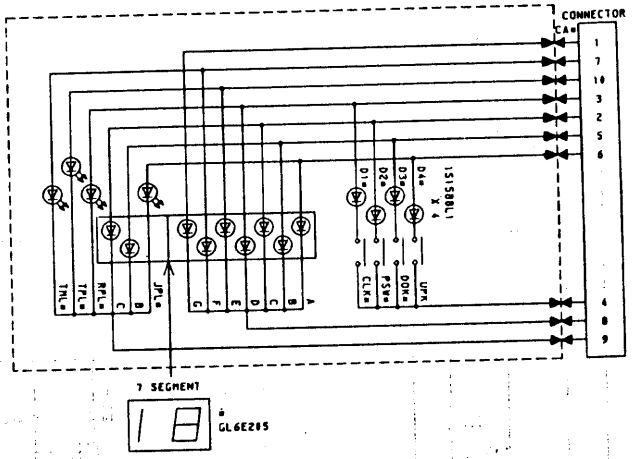
CLR HI201 (IC) INTERNAL CIRCUIT



OPERATION CIRCUIT— B

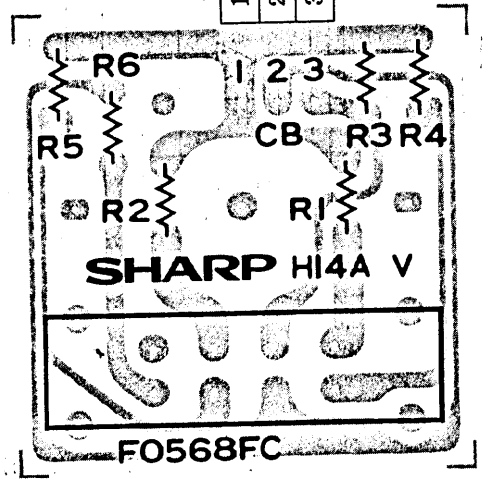


OPERATION CIRCUIT— A



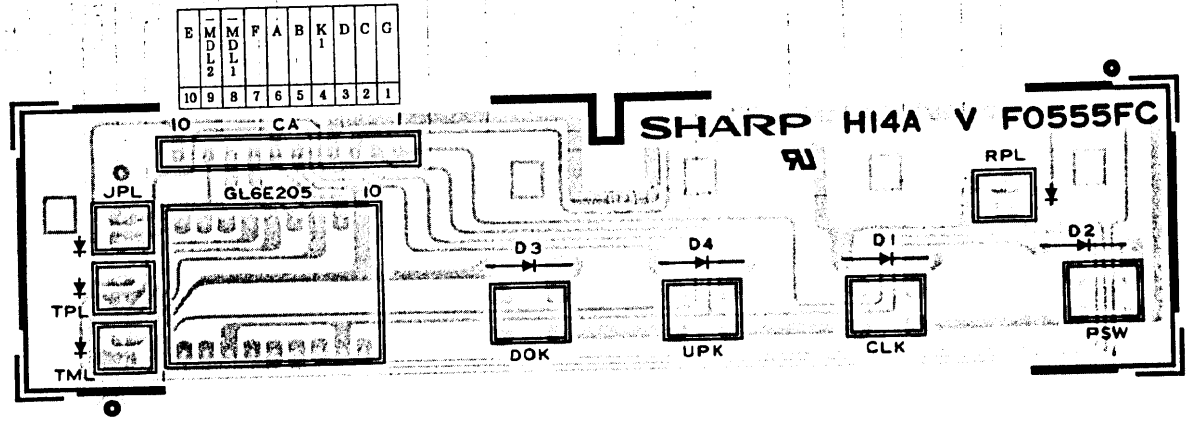
OPERATION P.W.B. B

1	2	3
GND	VL	VR

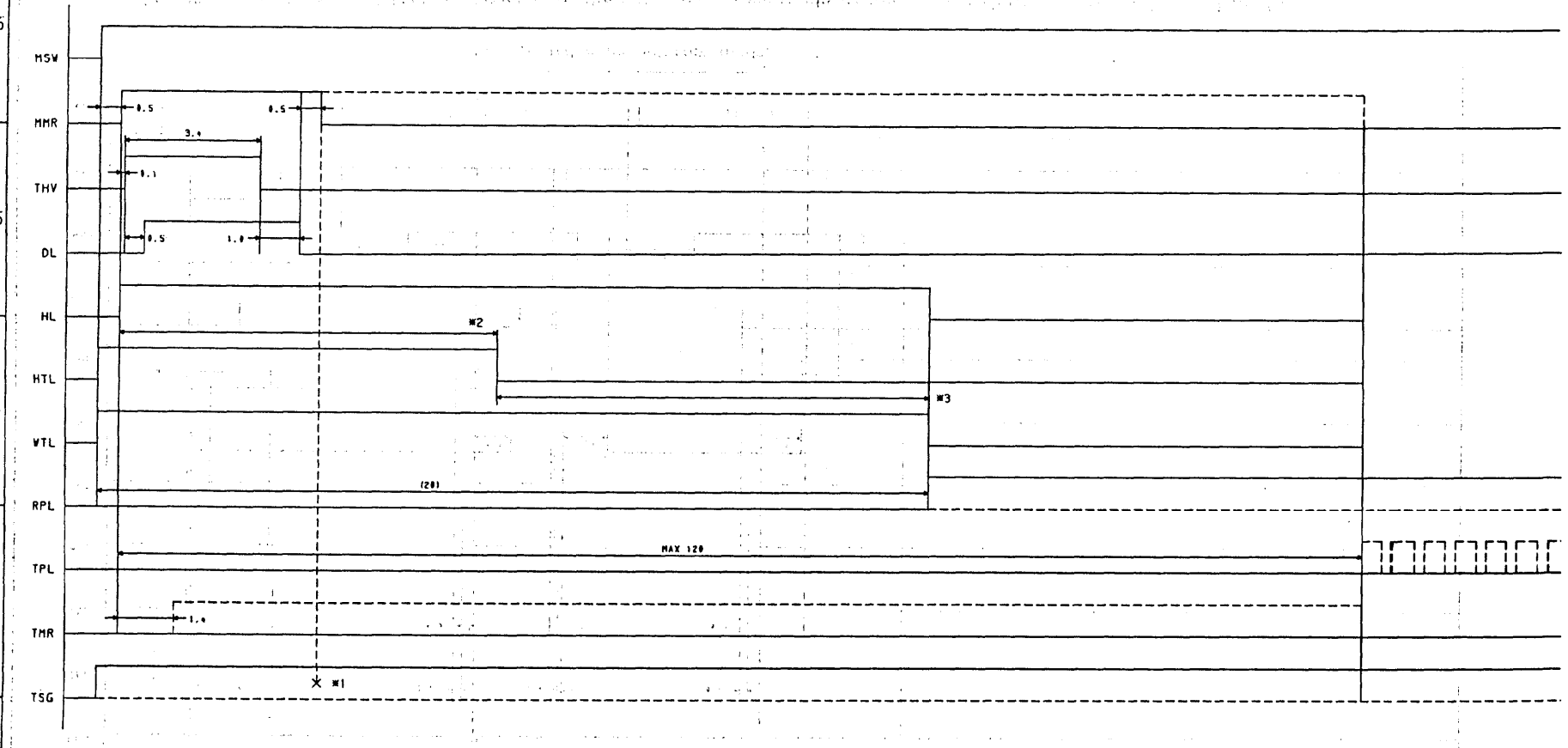


OPERATION P.W.B. A

E	-MDL2	-MDL1	F	A	B	K1	D	C	G
10	9	8	7	6	5	4	3	2	1



TIME CHART 1 PRELIMINARY OPERATION



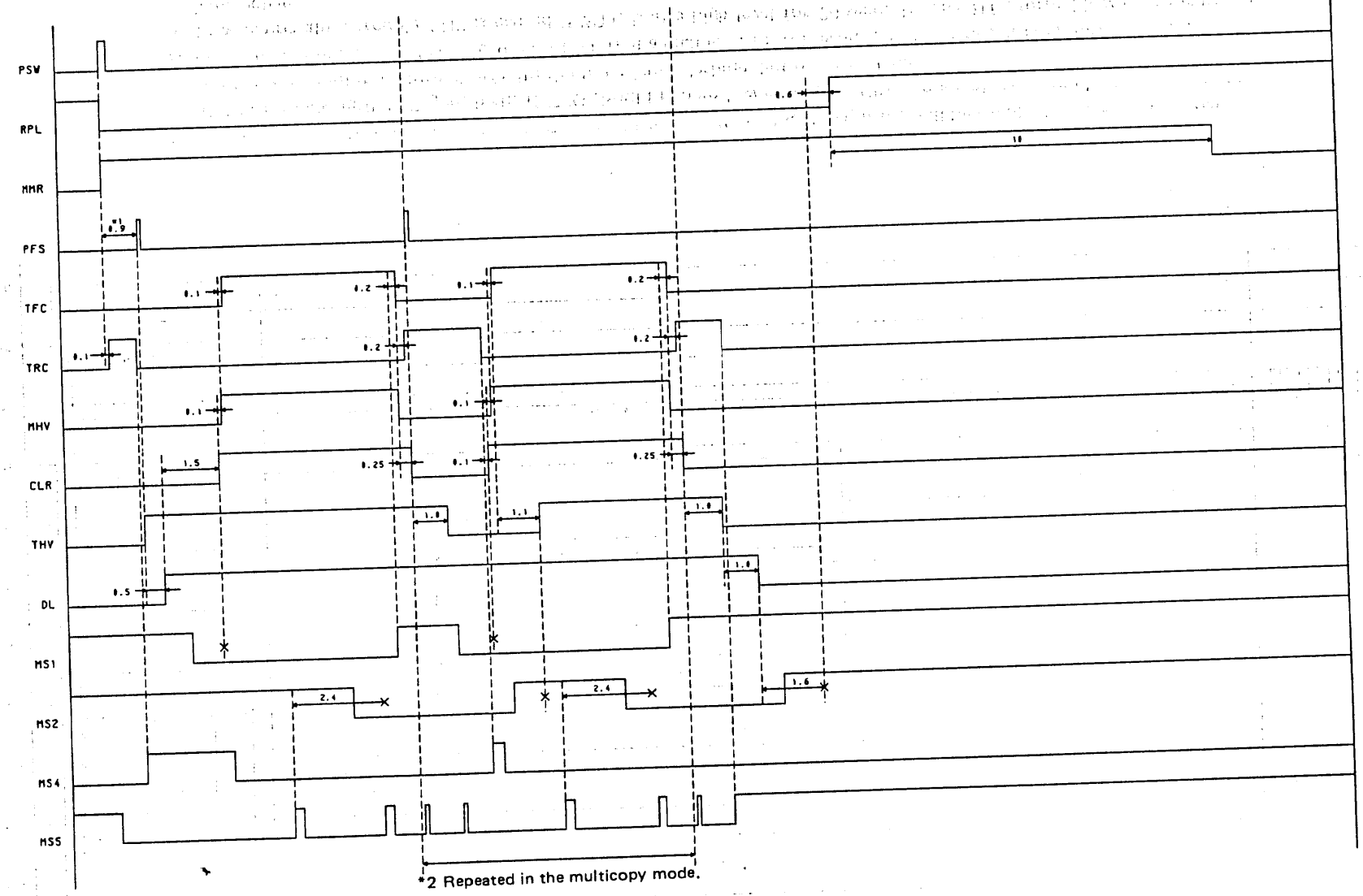
*1: The main motor is turned off when TSG is at a high level. If at a low level, toner will be supplied for a maximum period of 120 seconds until TSG goes high. If TSG should remain low even after 120 seconds of toner supply, the main motor and the toner motor are turned off with the toner lamp flashing, but no ready lamp.

*2: Low temperature trouble "H" is caused if HTL is at a high level for 30 seconds after the heater lamp turned active.

*3: Low temperature trouble "H" is caused if WTL is at a high level for 20 seconds after HTL turned low with the heater lamp active.

CAD-F0247

TIME CHART 2 A4 (8½ x 11") SIZE MULTI COPY (x 1.0)

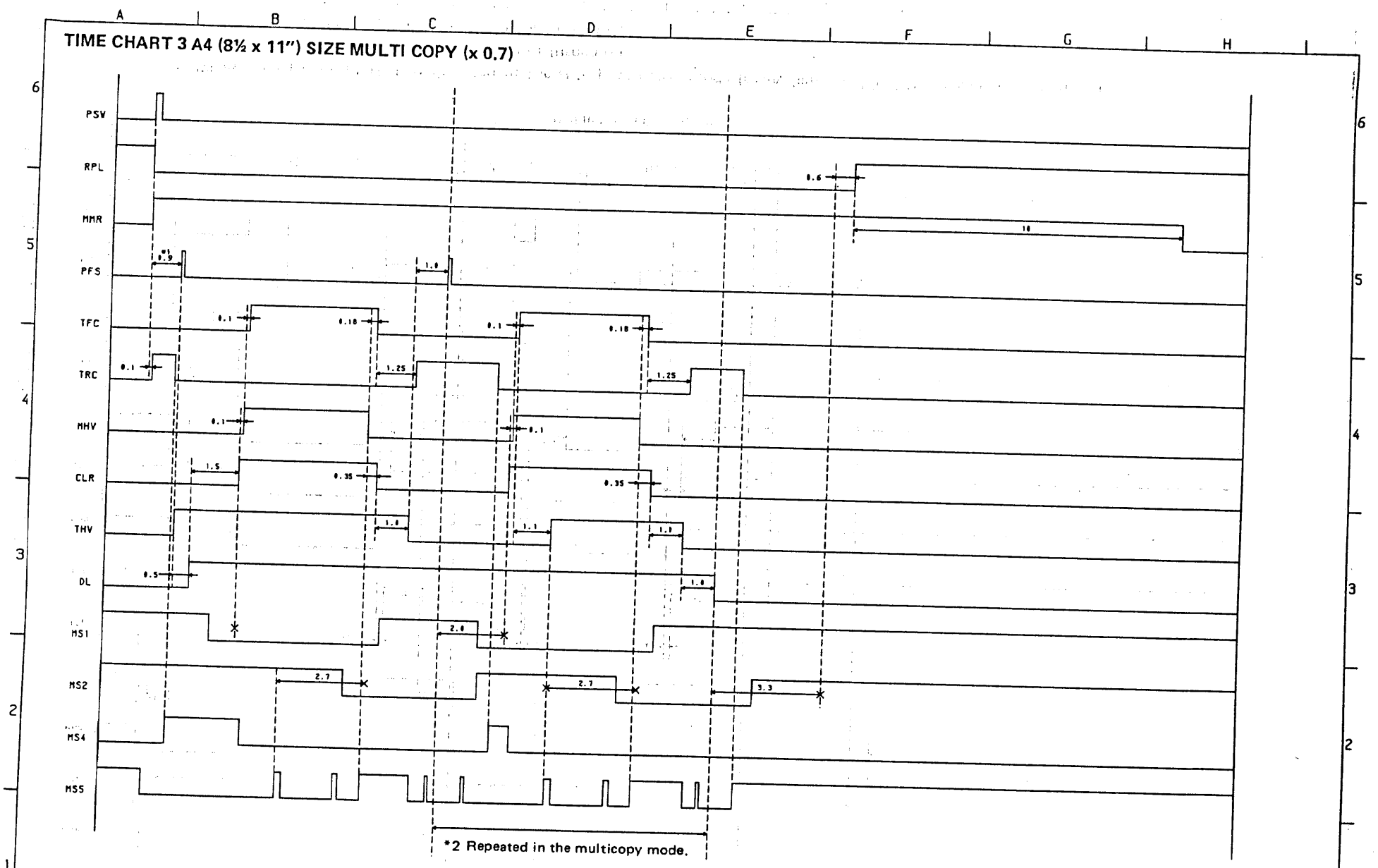


*1: When a high state of HTL is detected in the auto power save mode (ready lamp flashing), the paper feed solenoid is turned on in 7.6 seconds after the main motor turned on.

*2: In the single copy mode, multicopy timings are obsolete.

CAD-F0294

TIME CHART 3 A4 (8½ x 11") SIZE MULTI COPY (x 0.7)

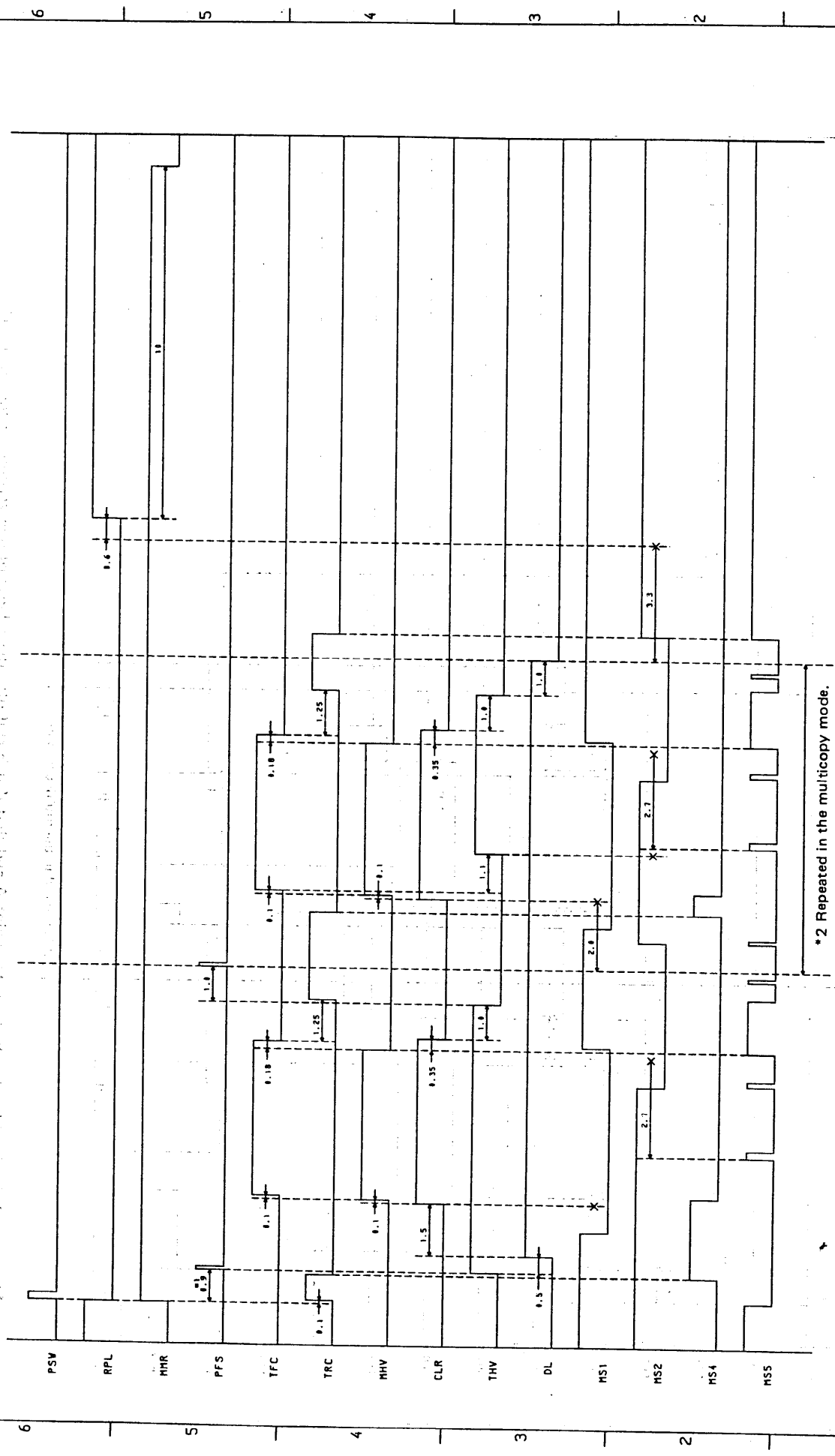


*1: If the MS1 should not actuate at the point A and that if it is still off after a lapse of one second, a paper misfeed is established. If turned on, the control proceeds to the procedure after the point A with a lapse of one second.

*2: In the single copy mode, multicopy timings are obsolete.

CAD-F0292

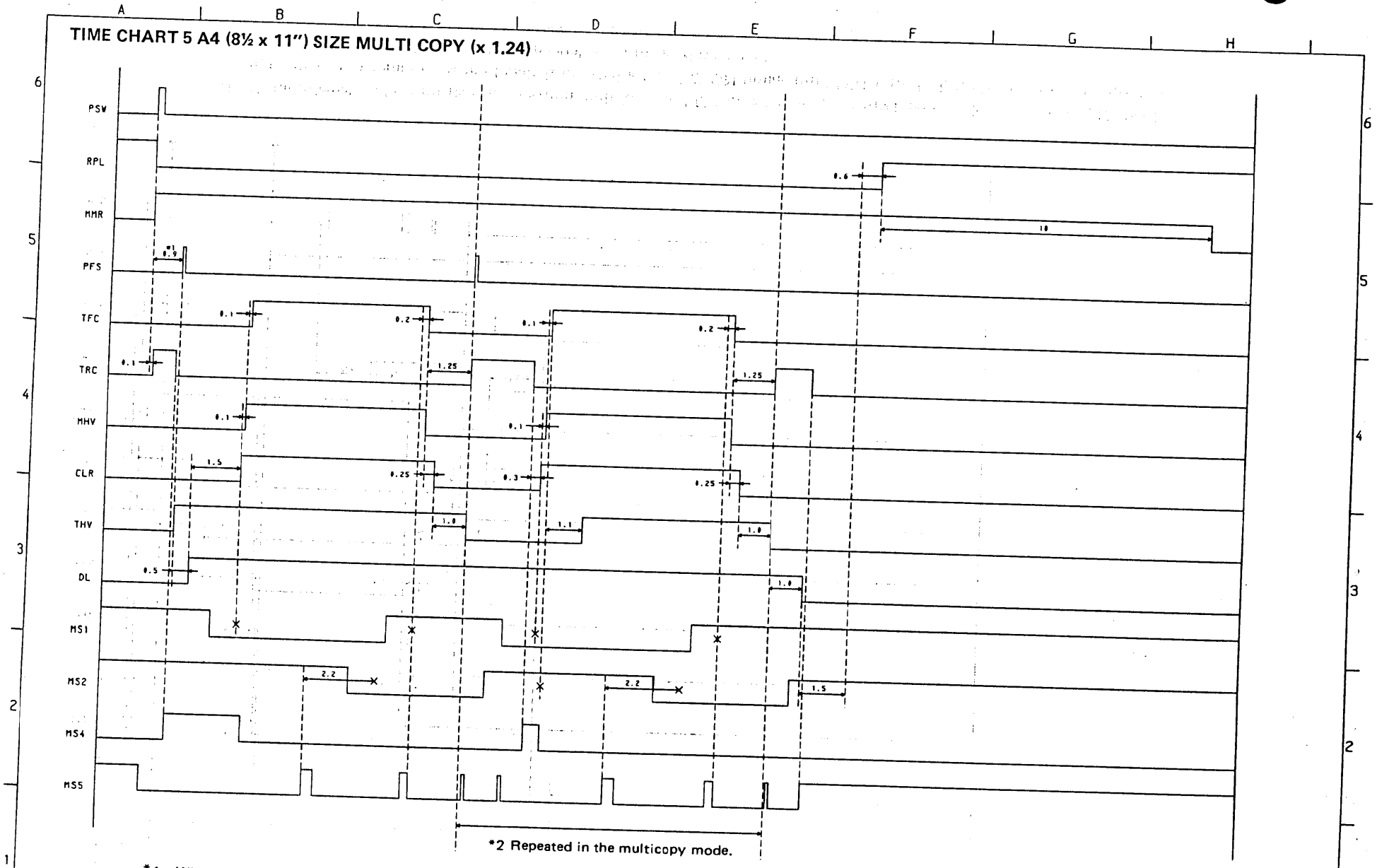
TIME CHART 4 A4 (8½ x 11") SIZE MULTI COPY (x 0.8)



*1: When a high state of HTL is detected in the auto power save mode (ready lamp flashing), the paper feed solenoid is turned on in 7.6 seconds after the main motor turned on.

*2: In the single copy mode, multicopy timings are obsolete.

TIME CHART 5 A4 (8½ x 11") SIZE MULTI COPY (x 1.24)

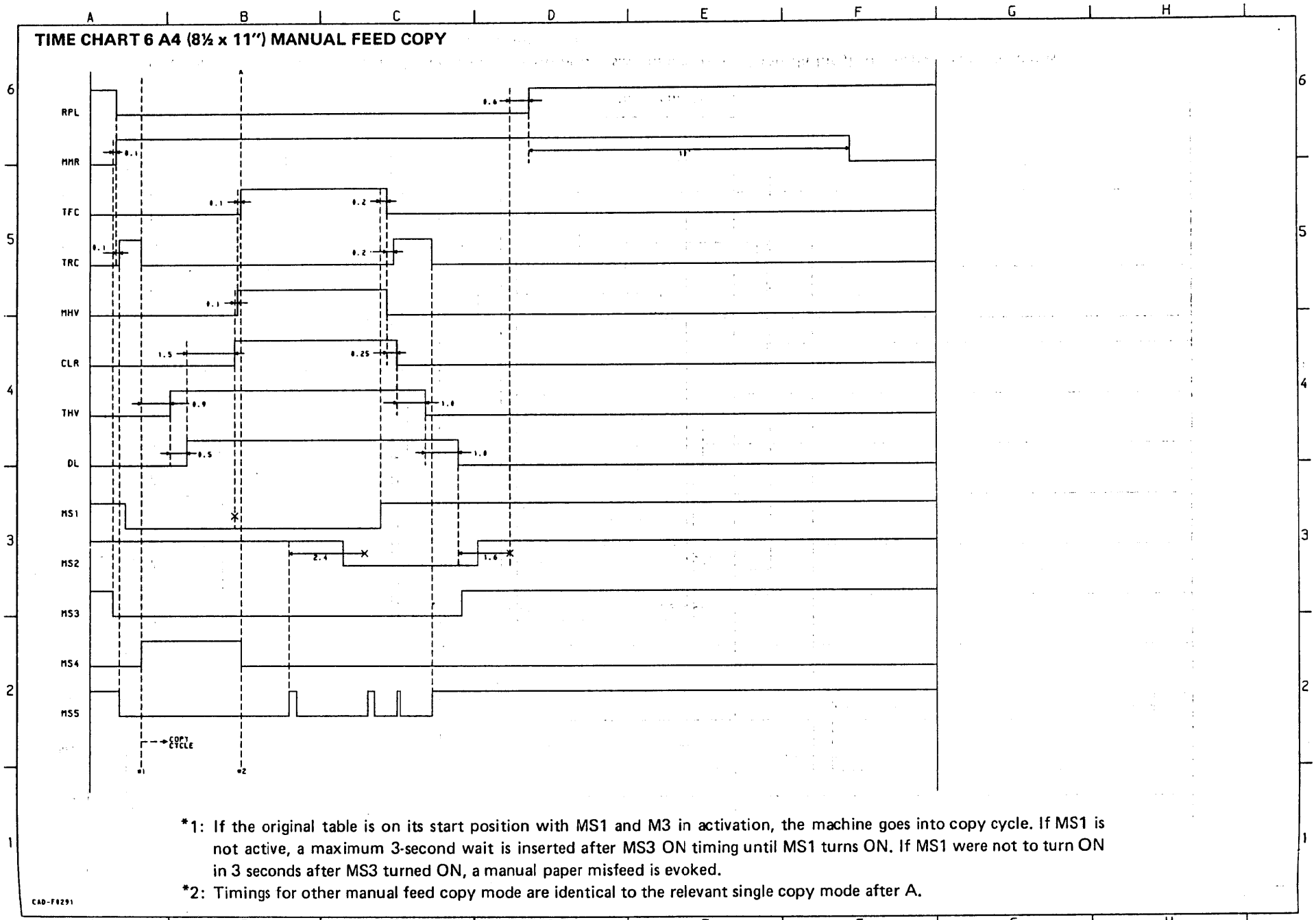


*1: When a high state of HTL is detected in the auto power save mode (ready lamp flashing), the paper feed solenoid is turned on in 7.6 seconds after the main motor turned on.

*2: In the single copy mode, multicopy timings are obsolete.

CAD-F0295

TIME CHART 6 A4 (8½ x 11") MANUAL FEED COPY

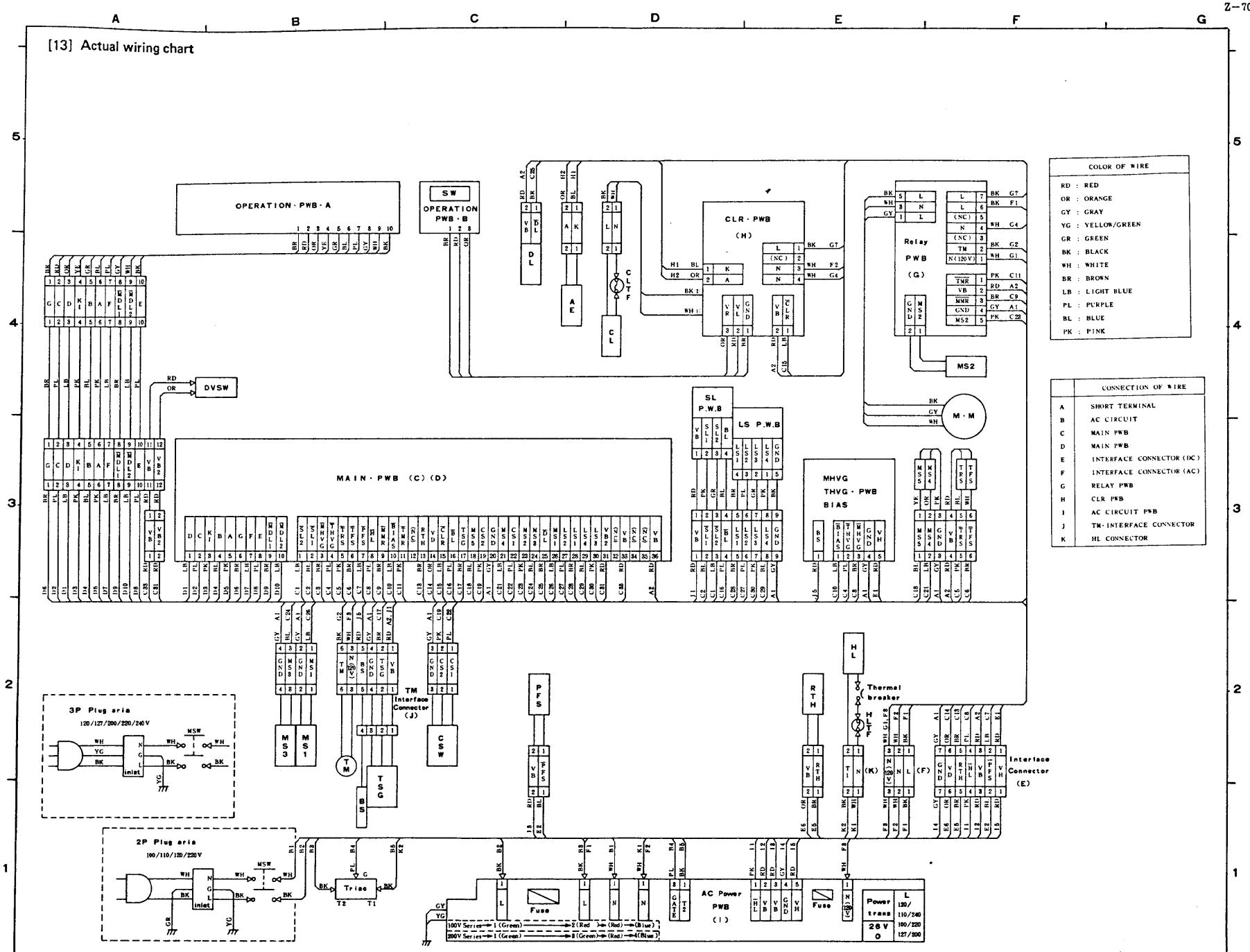


*1: If the original table is on its start position with MS1 and M3 in activation, the machine goes into copy cycle. If MS1 is not active, a maximum 3-second wait is inserted after MS3 ON timing until MS1 turns ON. If MS1 were not to turn ON in 3 seconds after MS3 turned ON, a manual paper misfeed is evoked.

*2: Timings for other manual feed copy mode are identical to the relevant single copy mode after A.

CAD-F0291

[13] Actual wiring chart



COLOR OF WIRE	
RD	RED
OR	ORANGE
GY	GRAY
YG	YELLOW/GREEN
GR	GREEN
BK	BLACK
WH	WHITE
BR	BROWN
LB	LIGHT BLUE
PL	PURPLE
BL	BLUE
PK	PINK

	CONNECTION OF WIRE
A	SHORT TERMINAL
B	AC CIRCUIT
C	MAIN PWB
D	MAIN PWB
E	INTERFACE CONNECTOR (DC)
F	INTERFACE CONNECTOR (AC)
G	RELAY PWB
H	CLR PWB
I	AC CIRCUIT PWB
J	TM-INTERFACE CONNECTOR
K	HL CONNECTOR